

C
C71cZf
1906/07-
1930/31



THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Colorado College

**Colorado
School
of Forestry**

Prospectus 1906

COLORADO SPRINGS, COLORADO

LIBRARY
OF
THE UNIVERSITY OF COLORADO

The Colorado School of Forestry

W. C. STURGIS, PH. D.

Dean

MR. J. FRED BAKER

Assistant Professor of Forestry

6
29124
17307-
173031

The Colorado School of Forestry

The Claims of Forestry

The Rocky Mountain region in the States included in that area still possesses a very large amount of valuable timber, notwithstanding the ravages made upon it. It is of vital importance, not only to the interests of the lumberman, but also to those of the farmer, that the existing timber should be preserved, and that the present forested areas should be extended as far as possible by judicious planting, especially on the water-sheds denuded by fire and flood. For it is upon forested water-sheds that the farmer has to depend chiefly for the storage of his water supply during the winter and its gradual distribution during the summer. That the Federal Government is thoroughly alive to the necessities in the case is evidenced by the existence of immense areas which have, within recent years, been withdrawn from settlement and are maintained at great expense as national forest reserves. It is safe to say that fully one-half of the efficiency of the Government's recent extensive irrigation projects would be lost were it not that the policy of preserving and perpetuating the forests, and thereby conserving the water-supply, is pursued conjointly with these projects for the distribution of the water.

But the national Government can not meet all of the exigencies. The people at large must be taught the value of permanent forests; the owners of forest lands must learn how to turn their property to best account by lumbering operations conducted on a scientific basis, so that they may be a source not only of immediate profit, but of an assured income for future generations, and trained men must be at the service of the owners of forest lands to assist with their advice and co-operation in the judicious exploitation of such lands. Much is required in the training of the expert forester. He must have a complete knowledge of forest botany, especially of the region in which his operations lie; he must be thoroughly acquainted with every detail concerning the value of forests, their maintenance and their development; he must be able to estimate the quantity and

29124
17307-
173031

value of standing timber and to direct all forms of lumbering operations on a scientific basis, and he must have accurate knowledge regarding the value and possible uses of all kinds of lumber. Furthermore, the forester must be trained in subjects related to, but distinct from, forestry proper—in civil engineering, to enable him to make correct topographical surveys of a given area, and to give intelligent advice regarding irrigation; in geology, to enable him to recognize the source and comparative value of soils; in chemistry, to acquire a knowledge of the derivatives of trees and of wood; in physics, in order to test the mechanical properties of timber and other materials; in biology, so as to be able to recognize the effects, deleterious and otherwise, of the plant and animal life of the forest.

To provide such a mental equipment for the prospective forester, there are at present only three or four special schools in the United States. Some of the State Universities give instruction in forestry, but the demand for expert foresters is far in excess of the supply. This is peculiarly true of the West, where the greatest forests of the country now exist, where there is the most pressing need for foresters, and where, up to the present time, no School of Forestry has existed.

Organization of the Colorado School of Forestry

In the spring of 1905, the increasing demand for instruction in theoretical and applied forestry led to the establishment of the Colorado School of Forestry as a department of Colorado College. The first step in the organization of the School was the acceptance on the part of the College of a gift of thirteen thousand acres of forested land, known as Manitou Park, and situated at a distance of twenty miles from Colorado Springs. The Park has been for some years used as a summer-resort, and visitors have been received at a small hotel and a number of adjacent cottages on the property. These, together with a smaller group of cottages a mile from the hotel, have now become available for the benefit of the School of Forestry.

The Park itself affords unusual opportunities. About two-thirds of its area is covered with a good stand of pine and spruce, much of the timber being now mature and ready for cutting. There is an abundance of young growth to replace the timber removed, and the rich land along a stream which waters the valley offers an excellent

opportunity for the study of tree-planting, the establishment of nurseries and experiments with various tree-seeds.

It is the purpose of the School to use Manitou Park for instruction in applied forestry, including forest botany, mensuration, tree-planting and lumbering, either by the establishment of a Summer School or by frequent trips to the Park on the part of instructors and students.

Most of the instruction in technical forestry will be given at Colorado College, in Colorado Springs. Here, also, will be given all of the instruction in topics directly related to forestry, *i. e.*, civil and irrigation engineering, geology, physics, chemistry and biology.

Object of the School

The principal aim of the School will be to give a thorough training to students who intend adopting forestry as a profession. In this connection it may be said that no profession today offers a better opportunity to a young man of good physique and the desire for an out-door life and plenty of hard work. The expert forester need never fear lack of employment. The Government Forest Service is constantly on the lookout for good men, and the demand for trained foresters on the part of private landowners is steadily increasing.

While the School has in view, first and foremost, the training of professional foresters, it recognizes the fact that there is a large number of people who have a passing or local interest in forestry, but who lack either the time or the desire for an extensive course. For the benefit of such, the School proposes to offer in the near future special short courses of study. These courses will be especially adapted to forest-rangers, whose duties permit of only brief absences from the Reserves.

Duration of Course

The full course will, for the present, cover only two years, as outlined in the curriculum given below. The first year will be devoted largely to elementary work in the subjects required; the second year to more advanced work, such as will fit the student to fill a secondary position in the Forest Service or to continue his studies at one of the larger eastern schools. It is intended, how-

ever, to offer, as soon as possible, such additional instruction as will fit the student to fill any position which may offer.

The Fall term of the School begins September 12, 1906, on which date all students must present themselves for registration.

Requirements For Admission

Before registering, each candidate must present to the Dean a certificate of moral character signed by some responsible person in the community in which he has made his home.

No intellectual test will be applied to candidates for admission, but every candidate must satisfy the Dean of his ability to pursue the studies required in the course. In general, a candidate should have a High School training or its equivalent.

Fees and Expenses

The fee for tuition will be fifty dollars for each year of the course. This does not include the small special fee charged in certain of the prescribed laboratory courses, nor does it include the railway fares to and from Manitou Park.

Course of Study of the Colorado School of Forestry

COURSES TO BE GIVEN IN COLORADO COLLEGE

FIRST HALF OF THE FIRST YEAR

MATHEMATICS—A. *Algebra*. Series; The Binomial Theorem; Logarithms. Undetermined Coefficients; Theory of Equations. Four hours.

CHEMISTRY—B. *Advanced Chemistry*.—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science, and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. Three hours' recitation or lectures, and four hours of laboratory work (counts three hours). Laboratory fee, \$7.00. Professor Strieby.

GRAPHICS—A. *Elements of Drawing*.—This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow-pen, conventional representations, mathematical curves, cycloidal and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both free-hand and ruled, methods of spacing and laying out titles. Mr. Moore.

Students are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

BIOLOGY—A. *General Biology*.—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution. First half-year: Laboratory study of typical green flowering plants, with special reference to the structure and

function of their various organs; a comparative study of cryptogams, beginning with the simplest forms. Second half-year: Careful dissection of the frog and microscopic study of some of the more important organs; some of the simpler forms of animals. Recitations, lectures, and laboratory work. Six hours (counts three hours). Laboratory fee, \$2.50. Professor Schneider.

PHYSICS—A. *General Physics*.—Credit, three or four hours. Laboratory book fee, 25c.

(1) Three lectures and one recitation per week. In these lectures the experimental and historical development of the subject will be emphasized. No mathematics is required beyond that necessary for entrance to College.

(2) Collateral reading or laboratory work. Those taking this course as the Science requirement will be assigned laboratory work, one period of two hours per week. Professor Shedd.

ECONOMICS—A. *Elementary Economics*.—A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, followed by lectures and assigned reading on the general principles of consumption, production, exchange and distribution. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law or journalism, the general rules and principles contributed to business by the science of economics. Two hours. Professor Urdahl.

GERMAN.—Elementary course designed to serve as an introduction to the German language, and as a preparation for further study.

FORESTRY—A. 1. *Principles of Forestry*.—This is a lecture course which presents tersely the idea of Forestry as a whole, and aims to give the student an understanding of the demands of the profession.

2. *Forest Influences*.—The relation of forests to climate, soil and topography are discussed in a series of lectures. Professor Baker.

SECOND HALF OF THE FIRST YEAR.

MATHEMATICS—A. *Plane Trigonometry*.—The functions of one and two angles; the solution of triangles; simple applications. Two hours.

GRAPHICS—B. *Descriptive Geometry*.—The work consists of recitations from text-books and the graphic solution of problems. After the necessary elementary problems, special attention is given to the practical side of this subject, in its relations to stereotomy, pattern-making, sheet metal work and machine drawing. Mr. Moore.

Students are expected to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

CIVIL ENGINEERING—A. *Theory and Practice of Surveying*.—Construction, use and adjustment of instruments; pacing survey; contouring and leveling by hand-level; theory of stadia measurements; azimuth traverse; balancing survey. Two recitations and two afternoons' field or office work. Fee, \$4.00. Professor Lyon.

BIOLOGY—A.

GERMAN.

FORESTRY—B. *Soil Physics*.—A study of the agencies at work in soil formation and destruction. Special attention is given to the preservation of forest soil. Lectures and laboratory work. Two hours. Fee, \$3.00. Professor Baker.

FORESTRY—C. *Silviculture*.—This course takes up the establishment and care of seed-beds and the forest nursery. The transplanting of seedlings and the natural establishment and care of wood-lands. The characteristics, habits and distribution of our more important forest trees, as well as the distribution and character of the forests in the United States as a whole. Lectures at Colorado College. Field work at Manitou Park. Fee, \$5.00. Professor Baker.

FIRST HALF OF THE SECOND YEAR

MATHEMATICS—C. *Calculus, Differential and Integral*.—First half-year, three hours. Second half-year, four hours.

GEOLOGY—A. *General Geology*.—Prerequisite, Elementary Chemistry. Dynamical, Structural and Historical Geology. Lectures, required reading and required field excursions on Wednesday afternoons until Thanksgiving. The student, while not required to do so, is advised to elect Mineralogy and Zoology before taking Geology, or at the same time with it. Texts: Chamberlin and Salisbury's *Geology*, Scott's *Introduction to Geology*. Three hours. Professor Finlay.

BIOLOGY—J. *Plant Physiology*.—Prerequisites, Biology A and Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. Five hours (counts two hours). Laboratory fee, \$3.00. Professor Schneider.

GERMAN—B. *Intermediate Course*.—Riehl, *Fluch der Schönheit*; Jensen, *Die Braune Erica*; Chamisso, *Peter Schlemihl*; Heine, *Harzreise*; Gerstaecker, *Germelshausen*; Lessing, *Minna von Barnhelm*; Schiller, *Wilhelm Tell*, *Lyrics and Ballads*. Dictation. *Prose Composition and Syntax*. Three hours. Professor Ahlers.

ENGINEERING, — AA. *Advanced Surveying*. — Topographic hydrographic, city and mining surveying. Instruments and field methods used in geodetic surveying. Simple, compound and reversed railroad curves; turnouts and switches; theory of earth-work computations. Two recitations and six hours of field or office work. Fee, \$4.00. Professor Lyon.

FORESTRY—D. *Wood Technology*.—The study and identification of the more important of the commercial woods of the United States with a discussion of the source and character of the forest products. Course as given consists partly of lectures, partly of laboratory work. Professor Baker.

FORESTRY—E. *Forest Protection and Management*.—The best methods for the economic protection and management of woodlands are taken up and discussed. Studies are made of the European methods and their conditions as compared with our own. Professor Baker.

FORESTRY—F. *Forest Accounts*.—This course is designed to give the student a working knowledge of the best methods of booking the business transactions which occur in the management of a forest. Professor Baker.

SECOND HALF OF THE SECOND YEAR

ENGINEERING—B. *Resistance of Materials*.—Laws of elasticity in homogeneous materials; coefficients of elasticity; relations between stresses and strains; common theory of torsion and flexure; elastic limits, working stresses and ultimate resistances of wrought iron, cast iron, steel, alloys, timber, building stones, concrete and masonry; simple and continuous beams; design and construction of iron, steel, and timber columns and beams, including design of plate girders; shafts; cables, specifications. Three hours' lectures and recitations, with work in the cement and testing laboratory. Fee, \$4.00. Professor Lyon.

GEOLOGY—A.

ENGINEERING—L. *Roads, Pavements and Parks*.—Surveys and locations; drainage and grade; foundations; selection and treatment of materials; maintenance of roads and pavements; design, construction and maintenance of parks and parkways. Two hours' credit. Lectures, recitations and assigned readings.

MATHEMATICS—C.

BIOLOGY—K. *Systematic Botany—Seed Plants*.—Perequisite, Biology A. Lectures on the principles of classification. A study of local flora is made, including the collection and determination of flowering plants. Some time is devoted to a study of the structural adaptations of plants to their surroundings. Three hours. Laboratory fee, \$2.00. Professor Schneider.

METEOROLOGY—D. *Elementary Meteorology*.—Prerequisite, Elementary Physics. Text: Davis' *Elementary Meteorology*. Three hours. Professor Loud.

ECONOMICS—G. *Public Finance*.—A survey of the whole field of public finance, including (a) public revenues, their nature, classification and characteristics with special emphasis on taxation; (b) public expenditures, their classification and relation to public welfare and to government functions; (c) the budget and its preparation in the great countries of the world; (d) public credit,

its nature, employment, industrial effects and administration. Lectures, recitations and collateral reading in Adams', Seligman's and Ely's works. Three hours. Professor Urdahl.

FORESTRY—D.

FORESTRY—G. *Diseases of Trees*.—A course of lectures and laboratory work on injuries to trees caused by parasitic fungi. Also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological vegetable physiology. Dr. Sturgis.

COURSES TO BE GIVEN IN MANITOU PARK

*FOREST BOTANY.—The object of this course is to enable the student to identify trees and shrubs under field conditions, both winter and summer. Special attention is given to the arborescent flora of the Rocky Mountain region. A comprehensive collection of native species is required to be handed to the instructor in charge at the close of the work. Professor Baker.

*FOREST PRACTICE.—The object of this course is to illustrate by practical field work the forestry operations during the different seasons throughout the school year. Professor Baker.

*FOREST ENTOMOLOGY AND ZOOLOGY. A.—This is a general study of the animal life of the forest. Special attention is given to insects causing injuries to tree growth. Their habits and the best methods of combating them are studied. A collection of representative species of insects properly named and labeled with field notes in detail is required to be handed to the instructor in charge upon completion of the work. Professor Baker.

*FOREST MENSURATION.—Methods for the calculation of the volume of felled and standing trees, the use and construction of log rules; the determinations of the increments of diameter, height and volume are discussed. Special attention is given to the methods of estimating standing timber on large forested areas. The instruction in this course consists partly of lectures and partly of practical field work. Professor Baker.

*Not given in 1906-07.

2
7/2/5
108/09

Prospectus

COLORADO
SCHOOL OF
FORESTRY

1908

THE LIBRARY OF THE
OCT 4 1961
UNIVERSITY OF ILLINOIS

Prospectus
Colorado School *of*
Forestry

1908

COLORADO COLLEGE
Colorado Springs, Colorado

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.,
President.

WILLIAM CODMAN STURGIS, PH. D.,
Dean and Lecturer in Vegetable Pathology.

HUGO A. WINKENWERDER, M. F.,
*Assistant Professor of Forestry and Manager of College
Reserve Lands.*

FLORIAN CAJORI, PH. D.,
Professor of Mathematics.

GEORGE J. LYON, C. E.,
Professor of Civil Engineering.

C. W. D. PARSONS, A. B.,
Professor of Physics.

WILLIAM STRIEBY, A. M., E. M.,
Professor of Chemistry.

EDWARD C. SCHNEIDER, PH. D.,
Professor of Biology.

GEORGE IRVING FINLAY, PH. D.,
Professor of Geology.

GEORGE M. HOWE, PH. D.,
Professor of German.

HOWARD MOORE, C. E.,
Assistant Professor of Graphics.

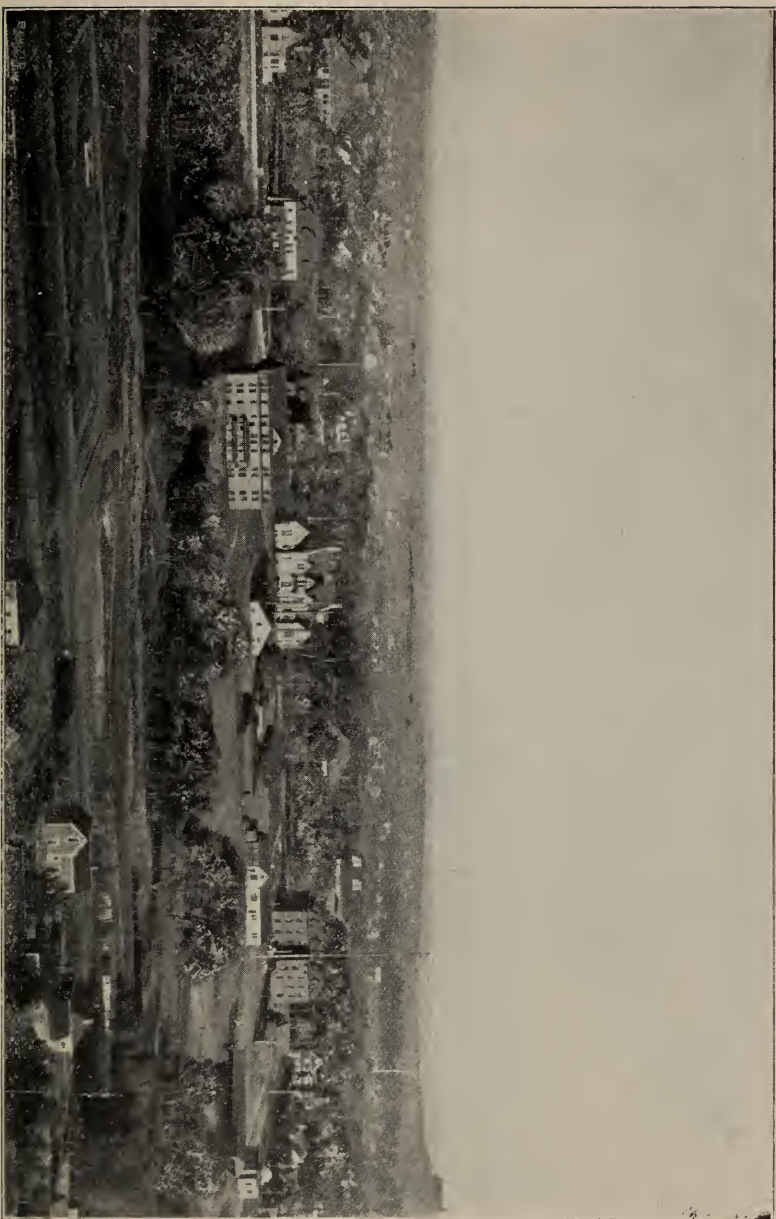
HOMER E. WOODBRIDGE, A. M.,
Professor of English.

C. J. FOREMAN, A. M.,
Professor of Economics.

W. A. MITCHELL.
Foreman College Reserve Lands,

SPECIAL LECTURERS.

Provisions are being made for special lectures by lumbermen, engineers and Government Forest Officers. These lectures will be announced from time to time when all arrangements have been completed.



College Campus from Palmer Hall

CALENDAR

1908

- Sept. 15 Residence Halls open.
- Sept. 15 Registration Day.
- Sept. 16 First Semester begins at 8:15 A. M.
- Nov. 26 Holiday. Thanksgiving Day.
- Dec. 18 Christmas Recess begins at 5:00 P. M.

1909

- Jan. 5 Christmas Recess ends at 8:15 A. M.
- Jan. 25 Mid-Year Examinations begin.
- Feb. 1 Opening of Second Semester.
- Feb. 22 Holiday. Washington's Birthday.
- Apr. 3 Spring Recess begins at 1:00 P. M.
- Apr. 13 Spring Recess ends at 8:15 A. M.
- May 30 Holiday. Memorial Day.
- June 4 Examinations begin.
- June 16 Commencement.

COLORADO SCHOOL OF FORESTRY.

LOCATION.

The Colorado School of Forestry is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Saloons and the attendant destructive influences are absent. Radiating railroad systems, neighboring forests, and gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous canons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air.

Within easy reach of two large United States National Forests, Colorado Springs becomes an almost ideal seat for a School of Forestry.

ORGANIZATION.

The Colorado School of Forestry was established as a department of Colorado College in the spring of 1905. The increasing demand for practical instruction and the growing necessity for such instruction in the West led to the establishment of the school. The foundation was laid through the generosity of General William J. Palmer and Doctor William A. Bell, who presented to the College a tract of 13,000 acres of land, known as Manitou Park.

OBJECT.

The chief aim of the School is to give a thorough training to students who intend to adopt Forestry as a profession and to fit them for positions in the Government Forest Service or in private employ as expert Foresters.

Technical Foresters

ADVANTAGES AND EQUIPMENT.

Beside the many advantages afforded by the location of Colorado Springs and the ideal climate, the students have all the advantages accorded to the students of Colorado College. These include Scholarships, the College Library; the large and well equipped Laboratories of the Departments of Biology, Geology, Physics and Chemistry, and of the School of Engineering; the College Gymnasium, the Museum, the Literary Societies, the College Lecture Course and the use of Dormitories and Boarding Clubs. For further information on any of these points see the General Catalogue or address the Dean of the School of Forestry.

MANITOU PARK—THE FIELD LABORATORY.

Manitou Park is a tract of 13,000 acres situated twenty miles from Colorado Springs at the foot of Pike's Peak, and adjoining the Pike's Peak National Forest Reserve. The Park is under the direct supervision of the School of Forestry. For some years Manitou Park has been used as a summer resort and visitors have been received at a small hotel and a number of adjacent cottages on the property. These, together with another group of small cottages a mile from the hotel are available for the uses of the School of Forestry. The cottages are now being remodeled in conjunction with the School of Engineering and will make a most convenient and homelike group of school buildings for the Summer Courses.

13,000 Acres for Practice Work

A Summer Resort

The Park itself affords unusual opportunities for study and practical experience in the field. About two-thirds of its

Unusual area is covered with a good stand of pine and spruce. Much of the timber is
Opportunities for mature and both logging and milling
Field Work operations are now being carried on.

There is also an abundant young growth to replace the timber that is being removed. The rich land along a stream which waters the valley, offers an excellent opportunity for the establishment of nurseries

Forest and the study of tree planting. An effort will be
Nurseries made to bring the forest into the best possible producing condition. The students will here be

given an opportunity to take part, under the direction of the Professor of Forestry and the Reserve Foreman, in all the phases of the treatment and management of

Equipment at the forest. The School has a good working
Manitou Park equipment of axes, saws, calipers, surveying instruments, meteorological instruments, and such other apparatus as is needed in the study and care of the forest.

Through the courtesy of the Forest Service the students of the Colorado School of Forestry are allowed to inspect and study the work that is being done on the

National Pike's Peak and Leadville National Forest Re-
Forests serves. The proximity of the School to these

Reserves makes this work very feasible and offers one of the best opportunities to prepare the student for work in the Government Service.

DURATION AND ARRANGEMENT OF COURSE.

The course originally covered three regular college years and two months each during the summer of the first and second years. The summer work covers approxi-

Three mately the eight weeks between July fifteenth and
Years September fifteenth. This arrangement allows for a vacation of one month during the summer. The

student who has completed the work satisfactorily as outlined for three years will be awarded a Certificate of Graduation.

In the year 1909 the Colorado School of Forestry will

offer a regular four-year course which will supersede the three-year course. Students entering *Degree of B. F.* this course will be accepted as candidates for the Degree of Bachelor of Forestry. Any Student now pursuing the three-year course may become a candidate for a degree by so signifying before he begins his third year's work, and provided that he is able to fulfill all the requirements of the four-year course. It is urged that all students who expect to enter the school in the fall of 1908 select the four-year course.

The work of the summer terms is required as part of the regular course, but may be pursued independently of the remainder of the course. Persons attending *A Summer Course* only the summer course will be given a certificate of attendance. For a full announcement of the summer work see page 24.

REQUIREMENTS FOR ADMISSION.

Before registering, each candidate must present to the *Certificate of Moral Character* Dean a certificate of moral character signed by some responsible citizen in the place which he has made his home.

At present no intellectual test is applied to candidates for admission, but every candidate must satisfy the Dean of his ability to pursue the studies required in the course. It is especially desirable that a *Entrance Examination* candidate should have at least a High School training or its equivalent. In 1909 and thereafter a High School certificate will be required for admission.

Credit will be given for parallel studies *Credit from other Institutions* pursued at other institutions of high standing upon presentation to the Dean of certificates that such studies have been satisfactorily completed.

FEEES AND EXPENSES.

The fee for tuition is sixty dollars for each year of the course. This does not include the small special fee *Tuition \$60.00* charged in certain of the prescribed laboratory courses, nor the railway fares to and from Manitou Park.

SUMMARY OF EXPENSES.

Tuition.

Regular Course, for full year.....	\$60.00
Summer Course only (including laboratory fees)	20.00

Board.

In Hagerman Hall, per week.....	\$3.00
In the City, per week.....	\$4.00-\$8.00
Summer Course, board and lodging, per week	4.50- 5.50

Furnished Rooms.

In College Dormitory,* by the year.....	\$40.00-\$80.00
In the City, by the month.....	from 7.00 up.

Laboratory Fees.

Biology A	\$2.50
Biology J	3.00
Chemistry B	8.00
Physics B	8.50
Engineering A	4.00
Silviculture A	2.00
Silviculture B and C, together.....	3.00
Forest Botany A.....	2.50
Practice of Forestry (Course 22).....	5.00

Total for the entire course..... \$38.50

Average per year, about..... \$14.00

Text Books.

Of the more important books which treat of technical forestry, duplicates for the use of students will be found in the library. Though it is not required by the School it is advised that the following standard books be purchased by each pupil:

Forest Mensuration—*Graves*.
 Forestry—*Schwappach*.
 Manual of the Trees of North America—*Sargent*.
 Manual of Forestry—*Schlich*.
 Notes on Plane Surveying—*Tracy*.
 Studies in Forestry—*Nisbet*.

* Students furnish towels and bed linen.

COURSE OF STUDY—Three-Year Course.

FIRST YEAR.

<i>First Semester.</i>		<i>Second Semester.</i>	
	Hours per week.		Hours per week.
Mathematics A(1).....	3	Mathematics A(3)	4
{ Chemistry B	7	{ Chemistry B	7
or		or	
*Silviculture A and B.....	6	*Silviculture B and C.....	6
Biology A	6	Biology A	6
English B	3	English B	3
German A	3	German A	3
Graphics A	6	Forest Botany A.....	3
	28		26

SUMMER COURSE.

Forest Botany A and B. Mensuration A. Civil Engineering A.

SECOND YEAR.

	Hours per week.		Hours per week.
Physics B	8	Physics B	8
{ Chemistry B	7	{ Chemistry B	7
or		or	
*Silviculture A and B.....	6	*Silviculture B and C.....	6
German C	2	German C	2
Meteorology	3	Engineering L	2
Geology A-F	6	Forest Technology	2
{ *Biology J	5	Forest Botany B.....	5
or		*Forest Law A.....	3
English C	3	or	
	30	*Entomology	2
			28

SUMMER COURSE.

Silviculture D. Forest Management A and B.
Civil Engineering AO. Lumbering.

THIRD YEAR.

	Hours per week.		Hours per week.
History of Forestry.....	3	{ *Forest Law A.....	4
Economics A	2	or	
{ *Biology J	5	*Entomology	3
or		Forest Geography	4
English C	3	Forest Botany C.....	3
Lumbering.....	3	Forest Management E.....	4
Forest Geography	3	Forest Law B.....	2
Forest Management C and D	4	Practice of Forestry. .	
	20		17

* Given only in alternate years.

COURSE OF STUDY—Four-Year Course.*

FIRST YEAR.

<i>First Semester.</i>		<i>Second Semester.</i>	
	Hours per week.		Hours per week.
Mathematics A(1).....	3	Mathematics A(3).....	3
Introduction to Forestry*... 1		Forest Botany A.....	6
Graphics A	6	Biology K—Systematic	
Biology A	6	Botany*	3
English B	3	Biology A	6
German A	3	English B	3
Economics A	2	German A	3
	24		24

SUMMER COURSE.

Forest Botany A and B. Forest Mensuration. Civil Engineering A.

SECOND YEAR.

	Hours per week.		Hours per week.
Chemistry B	7	Chemistry B	7
Physics B	8	Physics B	8
Biology J or Geology A. F... 6		Forest Botany B.....	3
Silviculture A	4	Forest Botany C.....	2
		Engineering A. O.—	
		Mapping*	4
		Silviculture B	2
	25		26

SUMMER COURSE.

Silviculture D. Forest Management A and B. Lumbering A.

THIRD YEAR.

	Hours per week.		Hours per week.
German N	2	Forest Geography	4
Biology J or Geology A.... 6		Economics H—Economic	
Law F—Real Property*.... 2		Theory*	3
Engineering I—		Law F—Real Property*.... 2	
Water Supply*	3	Engineering J—Irrigation*... 2	
Geology B—Minerology* 6		Engineering L—Roads and	
Silviculture B	4	Trails	2
English C	3	Geology B—Minerology*.... 6	
		Silviculture C	4
		English T*	2
	26		25

* Preliminary Outline.—Starred courses are not described in this Prospectus—see General Catalogue of Colorado College.

SUMMER COURSE.

Six weeks' practical work in the field.

FOURTH YEAR.

	Hours per week.		Hours per week.
Meteorology	3	Forest Etomology	3
Wood Technology	4	Soil Physics*	3
History of Forestry.....	4	Forest Law A.....	4
Forest Management C and D	4	Forest Law B.....	2
Forest Geography	3	Lumbering B	4
Thesis	2	Forest Management E.....	4
		Practice of Forestry.	
	20		20

DESCRIPTION OF COURSES.*

1. Mathematics—PROFESSOR CAJORI.

A(1). *Algebra*.—Series; Variations; the Binomial Theorem; Logarithms; Undertermined Coefficients; Permutations and Combinations; Theory of Equations. First semester, 3 hours. Required of first-year students.

A(3). *Plain Trigonometry*.—The functions of one and two angles; the solution of triangles; De Moivres theorem; simple applications. Second semester, 4 hours. Required of first-year students.

2. Graphics.—PROFESSOR MOORE.

A. *Elements of Drawing*.—Includes elementary exercises to develop facility in the use of instruments, selected geometrical problems, cross-sections, shading with right line and bow pens, conventional representations, mathematical curves; isometric, oblique and orthographic projections; working drawings, tracings; the form and proportions of standard letters, both free-hand and ruled; methods of spacing and laying out titles. First semester, 6 hours. Required of first-year students.

Note. Students are required to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

3. Civil Engineering.—PROFESSORS LYON AND WINKENWERDER.

A. *Theory and Practice of Surveying*.—Construction, use and adjustment of instruments; pacing survey; contouring and leveling with spirit level and hand level; the use of the aneroid barometer; theory of stadia measurements; azimuth traverse; balancing survey. Summer course, 2 lectures and 3 half days' field work. Required of first-year students.

* Starred courses are given only in alternate years.

- A. O. *Office Work and Mapping*.—In this course the data collected in Course A will be worked up and plotted. Each student is required to make a topographical map of a portion of Manitou Park. Summer course, 6 hours, in two periods. Required of second-year students.
- A. F. *Advanced Surveying*.—Practical field and office work in topographical surveying and mapping. This work is taken up in connection with Course 22. See page 23. Required of third-year students.
- L. *Roads, Pavements and Parks*.—Surveys and locations; drainage and grade; foundations; selection and treatment of materials; maintenance of roads and pavements; design, construction and maintenance of parkways. Lectures, recitations and assigned readings. Second semester, 2 hours. Required of Second-year students.
4. Physics.—PROFESSOR PARSONS.
- B. *General Physics*.—Prerequisite, plane trigonometry.
- (1) Three lectures and one recitation per week. In these lectures the mathematical development of the subject will be emphasized.
- (2) Two periods of two hours each of laboratory work. First semester; Mechanics, Heat, Sound; Second semester; Light, Magnetism, Electricity. Throughout the year, 8 hours. Required of second-year students.
5. Chemistry.—PROF. STRIEBY.
- B. *Advanced Chemistry*.—Prerequisite, Course A (see General Catalogue), or High School Chemistry. This course gives a general knowledge of chemistry. The second semester is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry, will occasionally take

the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. Throughout the year, 3 hours recitation or lectures and 4 hours of laboratory work. Required of first or second-year students.

6. Biology.—PROFESSOR SCHNEIDER.

A. *General Biology*.—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution.

First semester: *Plant Studies*.—In the laboratory a comparative study is made of the cryptogams, beginning with the simplest forms. This is followed by a study of the structure of typical flowering plants.

Second semester: *Animal Studies*.—The laboratory work involves a study of representatives of the principal groups of animals.

Recitations or lectures, 2 hours; laboratory work, 4 hours. Throughout the year. Required of first-year students.

J.* *Plant Physiology*.—Prerequisites, Biology A and one year of Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First semester, 5 hours. Required of second or third-year students. Laboratory fee, \$3.00. Given in 1907-08 and alternate years.

7. Forest Botany.—DEAN STURGIS AND PROFESSOR WINKENWERDER.

A. *Morphology and Growth of Woody Plants*.—The form and growth of trees, the special morphology of the organs of woody plants and their relations to each other and the general development of the plant. Lectures, laboratory and field work. Second semester, 3 hours. Required of first-year students.



Pike's Peak



tu Park

B. *Dendrology*.—The characteristics of the important timber trees of the United States, both in their winter and summer conditions. The systematic side of the subject will be developed, and special emphasis will be placed upon distribution, both geographical and as influenced by the local conditions. Text, Sargent's Manual of the Trees of North America. The Silvical and Planting Leaflets of the National Forest Service will be used for collateral studies. Lectures, field work, and assigned readings. Required of first-year students during the summer, and second-year students during the second semester. 5 hours.

NOTE.—The identification of trees by means of bud and twig characters, though properly a part of Dendrology, will be begun in Forest Botany A in connection with the study of the morphology of buds and twigs. By this arrangement the characteristics of trees can be studied at all seasons of the year.

C. *Diseases of Trees*.—Prerequisites, Biology A and J. Lectures and laboratory work on injuries to trees caused by parasitic fungi. Also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological vegetable physiology. Second semester, 3 hours. Required of third-year students.

8. *Geology*.—PROFESSOR FINLAY.

A. F. *General Geology*. — Prerequisite, Elementary Chemistry. Dynamical and Structural Geology. Lectures, laboratory work Tuesday and Thursday afternoons, and field excursions on Saturday mornings. First semester, 3 hours. Required of second-year students.

9. *Meteorology*.—

Elementary Meteorology.—Prerequisite, Elementary Physics. Text, Davis' Elementary Meteorology. Second semester, 3 hours. Required of second-year students.

10. Entomology.*—

A study of the life histories and habits of injurious insects, with special reference to insects that attack trees and forest products. Methods of identification and methods of combating. Natural enemies. A collection of representative species of insects properly named and labeled is required to be handed in to the instructor upon completion of the work. Second semester, 2 hours. Required of second or third-year students. Given in 1908-09 and alternate years.

11. Silviculture.—PROFESSOR WINKENWERDER.

A.* *Silvics*.—The life histories of trees and the relations of trees to their environment. Special reference is made to the influence of temperature, light, moisture, and soils on tree growth. The relations of trees to each other in the forest. Injuries to forests and forest trees. Lectures and field work. First semester, 3 hours. Field work, 3 hours. Required of first or second-year students. Given in 1908-09 and alternate years.

B.* *Methods in Silviculture*.—Prerequisite, Silviculture A. The improvement of the forest through use and proper treatment. The reproduction of trees, the form and growth of stands, methods of thinning for improvement and reproduction; and silvicultural systems of management. Lectures and field work. First and second semesters, 3 hours. Field work, 3 hours. Required of first or second-year students. Given in 1908-09 and alternate years.

C.* *Forest Extension*.—The establishment of forests through artificial regeneration. Methods in nursery work, in direct seeding, in planting, and in the care of plantations are considered. Each student will be required to prepare a planting plan for a portion of Manitou Park. Lectures and field work. Second semester, 6 hours. Required of first or second-year students. Given in 1908-09 and alternate years.

D. *Field Work in Silviculture*.—A critical study of the work done in the forest at Manitou Park. Ex-

tensive exercises in marking trees for improvement and reproduction cuttings. Inspection of the nurseries at the Planting Station on the Pike's Peak National Forest Reserve and a general study of the silvicultural work done on the National Reserve. The inspection work will be written up in the form of reports. Summer Course, 3 half days. Required of second-year students.

12. Forest Mensuration.—PROFESSOR WINKENWERDER.

A. *General Study*.—The use and construction of log rules; the determination of the contents of logs in board, standard, volumetric, and cord measure; the contents of standing trees; the increment in diameter, height and volume of single trees and whole stands. The construction and use of volume and yield tables; the determination of the age of single trees and stands. Methods of timber estimating. Lectures and field work. Summer Course, 4 half days. Required of first year students. Text: Graves' Forest Mensuration.

13. Forest Management.—PROFESSOR WINKENWERDER.

A. *Mensuration*.—Mensuration in its special applications to forest management. Review of Mensuration A, and special applications to extensive timber tracts. Summer Course, 2 lectures; field work assigned. Required of second-year students.

B. *Forest Protection*.—The methods of economic protection of forests. European and Indian methods and their conditions as compared with our own will be discussed. Summer Course, 2 lectures; field work at Manitou Park and inspection work on the Pike's Peak National Forest as assigned. Required of second-year students.

C. *Forest Policy*.—The economic principles underlying the management of forests with special reference to private, State and National forest property. First semester, first six weeks, 4 hours. Required of third-year students.

D. *Forest Valuation*.—The determination of the financial results of forest management. The present and future value of forest property based on productive power. The taxation of forest lands. Lectures and assigned readings. First semester, last 10 weeks, 4 hours. Required of third-year students.

E. *Forest Regulation*.—A critical study of working plans for forest property in Europe, India and the United States. Methods used to secure sustained productiveness. Field methods, forest description, protection, utilization and administration. Second semester, 4 hours.

14. History of Forestry.—

A brief discussion of the development of methods in forestry and of the organization of the National and State forest policies in Europe, India and the United States. First semester, 3 hours. Lectures and assigned readings. Required of third-year students.

15. Forest Geography.—

The forest regions of the United States. The more important forest types of the country with special reference to the influences determining their local distribution. The best methods of silvicultural treatment. The forest products and the chief centers of their manufacture, distribution, and consumption. The National Forests will receive individual consideration in their relation to the forests, the forest resources and the water supply of the country. Lectures and assigned readings. First semester, 3 hours. Second semester, 4 hours. Required of third-year students.

16. Forest Law.—

A.* *State Law*.—A comparative study of the forest laws of several states. Special attention will be given to the weak and strong points in the law. Second semester, 3 hours. Required of second or third-year students. Given in 1907-08 and alternate years.

B. *National Forest Law*.—The laws relating to the National Forests and the Public Domain generally. A thorough study will be made of "The Use Book" of the Forest Service. Lectures and assigned readings. Second semester, 2 hours. Required of third-year students.

17. English.—PROFESSOR WOODBRIDGE.

B. *Rhetoric and Composition*.—Elementary Course, 3 hours throughout the year. Required of first-year students.

C. *Argumentation*.—Prerequisite, English B. First semester, 3 hours. Required of third-year students.

18. German.—PROFESSOR HOWE.

A. *Elementary Course*.—Joynes-Meissner's Grammar; Andersen, Maerchen; Storm, Immensee; Hauff, Daskalte Herz, Die Karavane; Eichendorff, Aus dem Leben eines Taugenichts. 3 hours, throughout the year. Required of first-year students.

C. *Scientific German*.—Prerequisite, German A. 2 hours, throughout the year. Required of second-year students.

19. Economics.—PROFESSOR FOREMAN.

A(1). *Elementary Economics*.—A general survey based upon the study and discussion of a text book giving the currently accepted scientific analysis of individual society, followed by lectures and assigned reading on the general principles of consumption, production, exchange and distribution. The purpose of the course is to teach the fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems. First semester, 2 hours. Required of third-year students.

20. Forest Technology.—PROFESSOR WINKENWERDER.

(1). The structural, mechanical, physical and chemical properties of wood. The commercial products derived from the forest.

- (2). The identification of the more important commercial woods.

Second semester, 2 hours. Required of second-year students.

21. Lumbering.—PROFESSOR WINKENWERDER, MR. MITCHELL and Special Lecturers.

- (1). *Lectures*.—The development of the lumber industry in the United States. The status of the lumber industry as compared to other industries. The movement of the lumber industry westward and southward. Typical operations in the woods and at the mills in different parts of the country will be fully discussed. The business side of the lumber industry. First semester, 3 hours. Required of third-year students.

- (2). *Field Work*.—A study, with detailed report, of the logging and milling operations in yellow pine now being carried on at Manitou Park. In this work special emphasis will be placed upon scaling and methods of transportation, roads, disposal of brush, contracts for sale of timber and methods for checking the cut. Summer Course. Required of second-year students.

NOTE.—There will be several special lectures by local lumbermen who are carrying on logging operations in the Rocky Mountains. The third-year students are also urged to spend the Christmas recess studying the details of some large operation.

22. The Practice of Forestry.—

During the fore part of April the work of the third and fourth-year students will be transferred to Manitou Park, where field work in Topographic Surveying, Estimating Timber, Forest Mapping, Road Building and Fireline Construction will be carried on. Plans, with estimated cost and revenues, will also be made for lumbering all areas from which the timber is to be cut during the succeeding year.

THE SUMMER COURSE IN FORESTRY.

This course is conducted at Manitou Park from about July 15 to September 15. It is part of the required work of the regular course in Forestry. It is, how-

July 15 to ever, well adapted for persons pursuing sub-
September 15 jects related to Forestry in other universities and who desire later to complete a regular course; for those who desire a very general knowledge of the principles of Forestry, and for those who are doing woods work and desire to enlarge their field of use-
Certificate of fulness in such work. A certificate of attend-
Attendance ance will be given for the studies that have been satisfactorily pursued.

Beginning with the Summer of 1909 this course will be considerably enlarged and will be made to include lectures, laboratory work and field excursions designed
A Teachers' especially to meet the requirements of teachers
Course in the Public Schools.

The tuition fee for those taking only the summer course is \$20.00 for the course, including laboratory fees. The students will occupy tents and cottages and are
Fees and required to furnish their own bed linen and
Expenses blankets. Board will be on the co-operative plan. Board and lodging together should not exceed \$4.50 to \$5.50 a week.

Students wishing to live at the Manitou Park Hotel can make arrangements with the hotel management for rooms and board at \$17.50 per week, the regular price charged tourists who stop there.

CURRICULUM FOR THE SUMMER COURSE.*

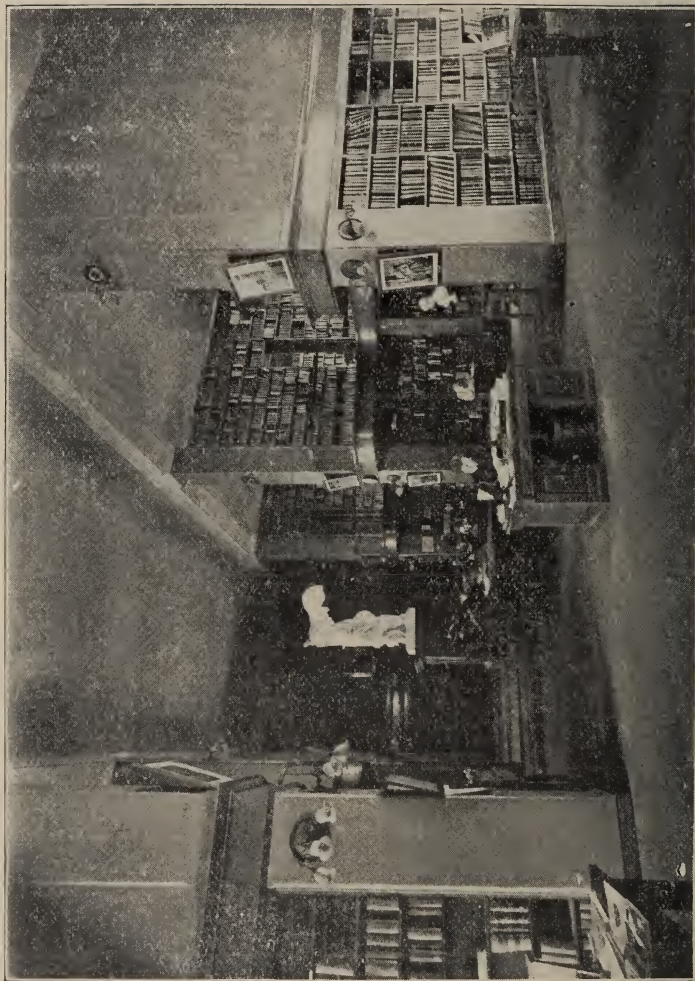
FIRST YEAR

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
8:00 - 9:00	Lecture Mensuration	Field Work in Surveying	Lecture Mensuration	Lecture Surveying	Lecture Mensuration	Lecture Mensuration
9:00 - 9:30						
9:30 - 10:30	Lect. Surveying		Lect. Forest Bot	Lect. Forest Bot.	Field Work in Mensuration	Lect. Forest Bot.
10:30-11:30	Field Work in Surveying		Laboratory in Forest Botany	Field Work in Mensuration		Laboratory in Forest Botany
11:30-12:30						
12:30 - 2:00						
2:00 - 5:00	Field Work in Surveying	Field Work in Surveying		Field Work in Mensuration	Field Work in Mensuration	

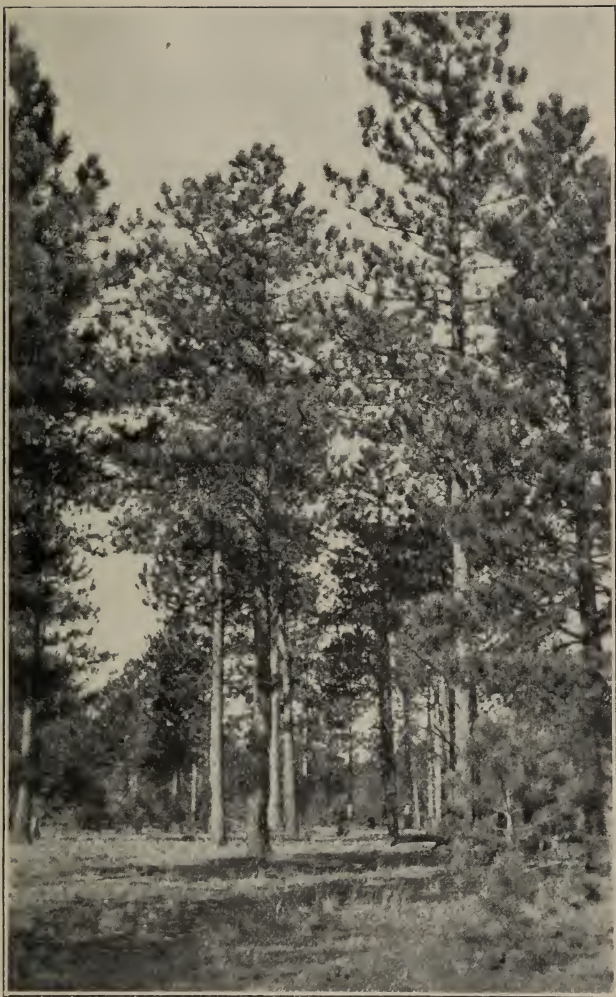
SECOND YEAR

8:00 - 9:00	Field Work in Silviculture All Day	Field Work in Management All Day	Office Work in Surveying	Office Work in Surveying		Field Work in Lumbering Half Day
9:00 - 9:30					Lect. Lumbering	
9:30 - 10:30					Lect. Mgmt. A	
10:30-11:00						
11:00-12:00			Lect. Mgmt. A.	Lect. Lumbering	Lect. Mgmt. A	
12:00-12:30						
12:30 - 2:00						
2:00 - 3:00					Lect. Lumbering	
3:00 - 3:30						
3:30 - 4:00			Field Work in Silviculture	Field Work in Lumbering	Lect. Mgmt. B.	
4:00 - 5:00	Lect. Mgmt. B.					

*In 1909 when the four-year course is installed, the third year students will be required to spend six weeks in the field doing actual work in forestry or lumbering and to make a complete report of the operation on which they are working.



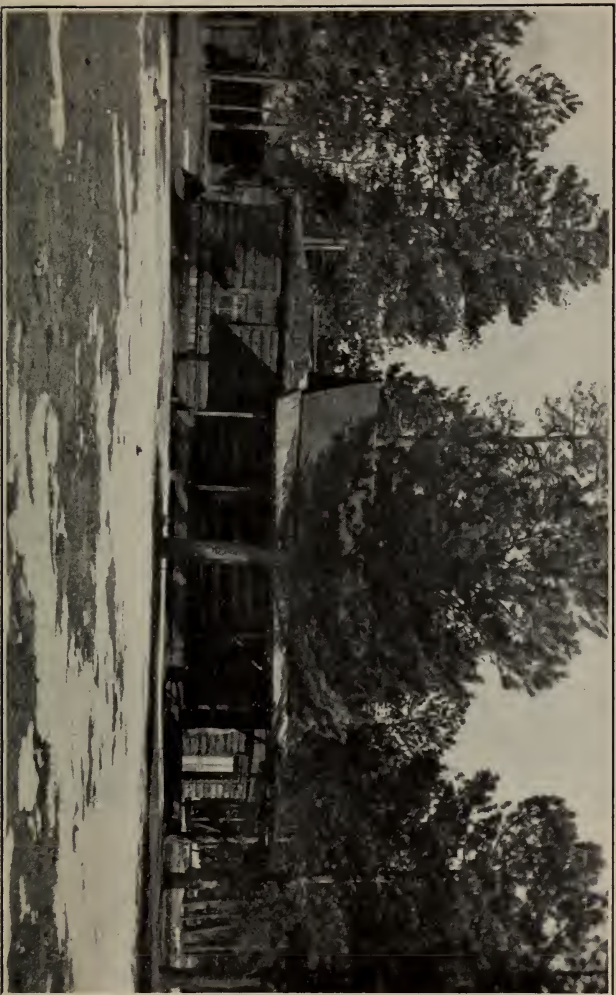
Partial View of College Library



A Bit of the School Forest, Manitou Park



Good Reproduction of Varying Ages, Manitou Park



One of the Metcalf Cottages at Manitou Park



Chemical Laboratory



Botanical Laboratory



Cottages at Manitou Park

11c2 f
009/10

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 40.

BULLETIN SERIES No. 36.

PROSPECTUS COLORADO SCHOOL OF FORESTRY

COLORADO SPRINGS, COLORADO

MARCH, 1909

Published by authority of the Board of Trustees of Colorado College every six weeks during the Academic year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado, under Act of Congress for July 16th, 1904.

COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 40.

BULLETIN SERIES No. 36.

PROSPECTUS COLORADO SCHOOL OF FORESTRY

COLORADO SPRINGS, COLORADO

MARCH, 1909

Published by authority of the Board of Trustees of Colorado College every six weeks during the Academic year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado, under Act of Congress for July 16th, 1904.

CALENDAR.

1909.

Jan. 5—	Christmas Recess ends at 8:15 A. M.	Tuesday
Jan. 25—	Mid-Year Examinations begin	Monday
Feb. 1—	Second Half-Year begins at 8:15 A. M.	Monday
Feb. 14—	Day of Prayer for Colleges	Sunday
Feb. 22—	Washington's Birthday: a holiday	Monday
Mar. 13—	Condition Examinations begin at 8:15 A. M.	Saturday
Mar. 23—	Last day for registering for Hawley and Mary G. Slocum scholarships	Tuesday
April 3—	Spring Recess begins at 1 P. M.	Saturday
April 13—	Spring Recess ends at 8:15 A. M.	Tuesday
May 1—	Interscholastic Field Meet	Saturday
May 30—	Memorial Day	Sunday
June 4—	Examinations begin	Friday
June 7—	Summer Term begins	Monday
June 13—	Baccalaureate Sermon	Sunday
June 14—	Class Day	Monday
June 16—	Commencement	Wednesday
Aug. 7—	Summer Term closes	Saturday
Sept. 14—	Residence Halls open	Tuesday
Sept. 14—	Registration	Tuesday
Sept. 15—	First Half-Year begins at 8:15 A. M.	Wednesday
Sept. 18—	Condition Examinations begin at 8:15 A. M.	Saturday
Nov. 10—	Insignia Day	Wednesday
Nov. 25—	Thanksgiving Day: a holiday	Thursday
Dec. 17—	Christmas Recess begins at 5 P. M.	Friday

1910.

Jan. 4—	Christmas Recess ends at 8:15 A. M.	Tuesday
Jan. 24—	Mid-Year Examinations begin	Monday
Jan. 31—	Second Half-Year begins at 8:15 A. M.	Monday
Feb. 13—	Day of Prayer for Colleges	Sunday
Feb. 22—	Washington's Birthday: a holiday	Tuesday
Mar. 12—	Condition Examinations begin at 8:15 A. M.	Saturday
Mar. 15—	Last day for registering for Hawley and Mary G. Slocum scholarships	Tuesday
Mar. 19—	Spring Recess begins at 1 P. M.	Saturday
Mar. 29—	Spring Recess ends at 8:15 A. M.	Tuesday
May 30—	Memorial Day	Monday
June 3—	Examinations begin	Friday
June 12—	Baccalaureate Sermon	Sunday
June 13—	Class Day	Monday
June 15—	Commencement	Wednesday

FACULTY.

WILLIAM FREDERICK SLOCUM, D. D., LL. D.

President.

WILLIAM CODMAN STURGIS, PH. D.

Dean and Lecturer on Vegetable Pathology.

H. A. WINKENWERDER, M. F.

Assistant Professor of Forestry and Manager of College Reserve Lands.

EDWARD C. SCHNEIDER, PH. D.

Head Professor of Biology.

FLORIAN CAJORI, PH. D.

Head Professor of Mathematics.

JOHN MAURICE CLARK, A. M.

Instructor in Political Economy.

GEORGE IRVING FINLAY, PH. D.

Professor of Geology.

GEORGE MAXWELL HOWE, PH. D.

Professor of German.

GEORGE J. LYON, C. E.

Professor of Civil Engineering.

WALTER J. MORRILL, M. F.

In charge Ranger Course.

HOWARD MOORE, C. E.

Assistant Professor of Graphics.

CHARLES W. D. PARSONS, A. B.

Professor of Physics.

YNA REINHARDT, A. B.

Instructor in German.

WILLIAM STRIEBY, A. M., M. E.

Professor of Chemistry.

HOMER E. WOODBRIDGE, A. M.

Assistant Professor of English.

SPECIAL LECTURERS.

Meteorology,

C. M. ANGELL,

In charge Weather Bureau Station at Colorado Springs.

Forest Law,

J. M. CATES,

Law Officer U. S. Forest Service, District 2.

Grazing and Live Stock,

W. C. CLOS,

U. S. Forest Service, Expert in Charge.

Hydrography,

A. L. FELLOWS.

Forest Administration,

FRED. W. MORRELL,

Chief, Office of Operation, U. S. Forest Service, District 2.

OTHER OFFICERS.

W. A. MITCHELL,

Foreman College Reserve Lands.

COLORADO SCHOOL OF FORESTRY.

LOCATION.

The Colorado School of Forestry is fortunate in its environment. Colorado Springs, the county seat of El Paso County, and the third largest municipality of the commonwealth, is remarkable for its history and character, and is admirably adapted to be the seat of a college. Saloons and the attendant destructive influences are absent. Radiating railroad systems, neighboring forests, and gold fields have fostered its wealth. Many visitors are attracted hither, both pleasure seekers and health seekers. The lover of nature might seek far before finding a spot more favored. The mountains are close at hand, their serrated outline occupying about one-third of the horizon. In the center of the range, less than a dozen miles away, stands Pike's Peak. Its summit is reached by a cog railway, as well as by bridle paths and a carriage road. About its base are numerous cañons, and in one of these, around a celebrated group of mineral springs, has grown up the city of Manitou. The climate of Colorado Springs has attained a world-wide reputation by reason of the opportunity for outdoor exercise afforded by the great number of fine days and the dryness and rarity of the air.

Within easy reach of two large United States National Forests, Colorado Springs becomes an almost ideal seat for a School of Forestry.

ORGANIZATION.

The Colorado School of Forestry was established as a department of Colorado College in the spring of 1905. The increasing demand for practical instruction and the growing necessity for such instruction in the West led to the establishment of the school. The foundation was laid through the generosity of General William J. Palmer and Doctor William

A. Bell, who presented the College with a tract of 13,000 acres of pine and spruce forest, known as Manitou Park.

When the school was first opened the course was only of three years duration and there was no degree. In 1908 the course was changed to four years and now leads to the degree of Forest Engineer. During the early part of this year two new courses were added; a short course of twelve weeks for forest rangers which is offered in coöperation with the United States Forest Service, and a graduate course of one year leading to the degree of Master of Forestry. The graduate course came as a result of the growing necessity for specialization. The school shows a very healthy growth for the past year, and the faculty will make every effort to keep it fully abreast of the times.

OBJECT.

The chief aim of the School is to give a thorough training to students who intend to adopt Forestry as a profession and to fit them for positions in the Government Forest Service or in private employ as expert Foresters.

ADVANTAGES AND EQUIPMENT.

Beside the many advantages afforded by the location of Colorado Springs and the ideal climate, the students have all the advantages accorded the students of Colorado College. These include Scholarships, the College Library, the large and well equipped Laboratories of the Departments of Biology, Geology, Physics and Chemistry, and of the School of Engineering; the College Gymnasium, the Museum, the Literary Societies, the College Lecture Course and the use of Dormitories and Boarding Clubs. For further information on any of these points see the General Catalogue or address the Dean of the School of Forestry.

MANITOU PARK—THE FIELD LABORATORY.

Manitou Park is a tract of 13,000 acres situated at the foot of Pike's Peak, and adjoining the Pike National

Forest Reserve. The Park is under the direct supervision of the School of Forestry. It is reached from Colorado Springs via the Colorado Midland Railway, 20 miles, to Woodland Park; thence by stage, 9 miles. For some years Manitou Park has been used as a summer resort and visitors have been received at a small hotel and a number of adjacent cottages on the property. These, together with another group of small cottages a mile from the hotel, are available for the uses of the School of Forestry. The cottages have been remodeled during the past year and will make a most convenient and homelike group of school buildings for the Summer Courses.

UNUSUAL OPPORTUNITIES.

The Park itself affords unusual opportunities for study and practical experience in the field. About two-thirds of its area is covered with a good stand of pine and spruce. Much of the timber is mature and both logging and milling operations are now being carried on. There is also an abundant young growth to replace the timber that is being removed. An effort will be made to bring the forest into the best possible producing condition. The students will here be given an opportunity to take part, under the direction of the Professor of Forestry and the Reserve Foreman, in all the phases of the treatment and management of the forest. The School has a good working equipment of axes, saws, calipers, surveying instruments, meteorological instruments, and such other apparatus as is needed in the study and care of the forest.

NATIONAL FORESTS.

Through the courtesy of the Forest Service the students of the Colorado School of Forestry are allowed to inspect and study the work that is being done on the Pike and Leadville National Forests. The proximity of the School to these Reserves makes this work very feasible and offers one of the best opportunities to prepare the student for work in the Government Service.

FOREST NURSERIES.

During the past year an excellent site has been obtained for a forest nursery. The plot is large enough to give the students ample practice in nursery methods. It is located on the banks of Monument Creek within ten minutes walk of the main buildings of the College. In addition the Forest Service maintains a large nursery at Palmer Lake, a half hour from Colorado Springs by rail. This nursery is available for study and inspection.

DURATION AND ARRANGEMENT OF COURSES.

Undergraduate Course.

The undergraduate course covers four regular college years and two months each summer during the first and second years. The summer work covers approximately the eight weeks between June 4 and August 1, allowing a vacation of six weeks during the summer.

Students who successfully complete this course will be awarded the Degree of Forest Engineer.

Summer Course.

The work of the summer terms is required as part of the regular course, but may be pursued independently of the remainder of the course. Persons attending only the summer course will be given a certificate of attendance. For a full announcement of the summer work see page 26.

Graduate Course.

Forestry as a profession has now become so broad that no one man can expect to become expert in all its various fields. During the past year arrangements have been made for a graduate course leading to the degree of Master of Forestry. The course is especially planned to meet the needs of those who wish to specialize along one or more definite lines of work. The student will be required to spend from seven

to nine months in the field studying the different phases of the specialty he chooses, and must prepare a comprehensive thesis covering all the details of the subject. Detailed outlines for study, itineraries for travel and other necessary directions will be furnished by the instructor in charge.

The plan is in accordance with the general movement in technical education to bring the student into direct contact with the actual problems of his chosen profession. Upon completion of the course the student should be in a position to direct successfully any phase of the work that comes under his supervision. For more detailed information see page 26.

Ranger Course.

The Ranger course is a special short course of twelve weeks planned to meet the needs of forest rangers and guards, timber cruisers, logging superintendents, woodland owners and others who wish to acquire a general knowledge of the principles of forestry, and the methods of handling timber lands. The United States Forest Service coöperates in the work of instruction.

In 1910 it is planned to begin this course about January 1 and to close March 26. For outline of studies see page 27, for expenses page 10.

REQUIREMENTS FOR ADMISSION.

All students who are not of sound bodily health and who do not care for a rough out-door life, which often means exposure and hardship, are cautioned against preparing for the profession of forestry.

For admission to the *Undergraduate Course* a student must have a high school training or its equivalent. He will be required to present his credentials to the Dean before registering. A candidate who is preparing for admission, should, so far as possible, arrange his studies to include high school

chemistry, physics, botany, and mathematics. In the *Graduate Course* only students who have received a degree from a college or university offering a full course in forestry will be accepted. Admission to the *Ranger Course* and the work of the *Summer Term* is without examination. Students desiring to enter the ranger course must be at least nineteen years old.

CREDIT FROM OTHER INSTITUTIONS.

Credit will be given for parallel studies pursued at other institutions of high standing upon presentation of certificates that such studies have been satisfactorily completed.

METHOD OF GRADING.

The passing grade in all forestry subjects is seventy. A grade below fifty is a failure, from fifty to sixty-nine inclusive is a condition. A condition may be removed by a subsequent examination; a failure means that the subject will have to be taken up again in a regular class. Any student who fails in two subjects, or fails in one and is conditioned in two, will be considered incompetent to carry the work and is liable to suspension from the course.

SUMMARY OF EXPENSES.

Tuition.

Regular Course, for full year (eleven months).....	\$60.00
Summer Course only (including laboratory fees)...	20.00
Ranger Course.....	15.00

Board.

In the City, a week.....	\$3.50-8.00
At Manitou Park*, board and lodging, a week	4.50-5.50

Furnished Rooms.

In College Dormitory*, by the year.....	\$40.00-80.00
In the City, by the month, from.....	6.00 up.

*Students furnish towels and bed linen.

Laboratory Fees.

Biology A.....	\$2.50
Biology J.....	3.00
Chemistry B.....	8.00
Physics B.....	8.50
Engineering A.....	4.00
Silviculture A.....	2.00
Silviculture B and C, together.....	3.00
Forest Botany A.....	2.50
Practice of Forestry (Course 22).....	5.00
Total for the entire course.....	<u>\$38.50</u>
Average per year, about.....	\$10.00

OUTLINE OF STUDIES.

Undergraduate Course.

FRESHMAN YEAR.

FIRST SEMESTER.	Hours a week.	Credit.	SECOND SEMESTER.	Hours a week.	Credit.
Mathematics A (1) ..	4	4	Mathematics A (3) ..	4	4
Intro. to Forestry ..	2	1	Forest Botany A ...	4	2
Graphics.....	2	1	Graphics.....	2	1
Biology A.....	6	3	Biology A.....	6	3
English B.....	3	3	English B.....	3	3
German A.....	3	3	German A.....	3	3
Economics A.....	2	2	Civil Engineering A	2	2
	<u>22</u>	<u>17</u>		<u>24</u>	<u>18</u>

SUMMER TERM.

Silviculture A. Forest Mensuration. Civil Engineering A.

SOPHOMORE YEAR.

Chemistry B.....	7	4	Chemistry B.....	7	4
Physics B.....	8	4	Physics B.....	8	4
Biology J or Geo. A.	6	3	Biology K.....	6	3
Forest Botany B ...	5	5	Forest Botany C ...	2	2
			Silviculture B.....	2	2
	<u>26</u>	<u>16</u>		<u>25</u>	<u>15</u>

SUMMER TERM.

Silviculture C. Forest Management A and B. Lumbering.

JUNIOR YEAR.

FIRST SEMESTER.	Hours a week.	Credit.	SECOND SEMESTER.	Hours a week.	Credit.
German C.....	2	2	German C.....	2	2
Biology J or Geo. A.	6	3	Forest Geography ..	4	4
Law F.....	2	2	Law F.....	2	2
Hydrography.....	2	1	Engineering L.....	2	2
Rocks and Soils	2	2	Silviculture D.....	4	2
English C.....	3	3	English T.....	2	3
Electives.....	8	5	Timber Physics.....	3	2
			Electives.....	6	3
	25	18		25	20

SENIOR YEAR.

Meteorology.....	1	1	Entomology.....	2	2
Forest Products....	4	3	State W'k in Fores'y	3	3
Forest Law.....	3	3	Forest Manag'mt E.	4	4
History of Forestry.	3	2	Lumbering.....	4	4
F. Manag'mt C, D..	4	4	Forest Geography ..	4	4
Lumbering.....	3	3	Seminary in Fores'y	3	1
Forest Geography ..	3	3			
	21	19		20	19

DESCRIPTION OF COURSES.

1. *Introduction to Forestry*.—PROFESSOR WINKENWERDER. A general survey of forestry. The forest as a natural resource; the relation of the forest to climate and water-supply; the natural history of the forest; the forests of the United States; the products of the forest; principles underlying the practice of forestry; the forestry movement in the United States; problems that must be solved in the United States; the practice of forestry by private owners, by the United States and by the various States; forestry as a profession. First semester, 2 hours. Credit 1 hour. Required of Freshmen.

2. Mathematics—PROFESSOR CAJORI.

A(1). *Algebra*.—Series; Variations; the Binomial Theorem; Logarithms; Undertermined Coefficients; Permutations and Combinations; Theory of Equations. First semester, 4 hours. Required of first-year students.

A(3). *Plain Trigonometry*.—The functions of one and two angles; the solution of triangles; DeMoivres theorem; simple applications. Second semester, 4 hours. Required of Freshmen.

3. English—PROFESSOR WOODBRIDGE.

B. *Rhetoric and Composition*.—Elementary Course. Required of all Freshmen. 3 hours, throughout the year.

C. *Argumentation*.—Prerequisite, Course B. Required of Juniors. First semester, 3 hours.

T. *Advanced Composition*.—Prerequisite, Course C. Required of Juniors, second semester. Two recitations, 3 hours' credit.

4. German.—PROFESSOR HOWE.

A. *Elementary Course*.—Joynes-Meissner's Grammar; Andersen, Maerchen; Storm, Immensee; Hauff, Daskalte Herz, Die Karavane; Eichendorff, Aus dem Leben eines Taugenichts. 3 hours, throughout the year. Required of Freshmen.

C. *Scientific German*.—Prerequisite, German A. 2 hours throughout the year. Required of Sophomores.

5. French.—PROFESSOR HILLS AND MISS REINHARDT.

A. *Elementary Course*.—Fraser and Squair's *French Grammar*; Aldrich and Foster's *French Reader*; George Sand, *la Mare au Diable*; Labiche et Martin, *le Voyage de M. Perrichon*. Writing from dictation, and practice in speaking. 3 hours, throughout the year. Elective.

B. *Intermediate Course.*

1. *Syntax and Prose Composition.* Fraser and Squair's *French Grammar*, and composition. 1 hour, throughout the year. Elective.
2. *Modern Prose and Poetry.* Alfred de Musset, *Pierre et Camille*; Daudet, *la Belle-Nivernaise*; Augier et Sandeau, *le Gendre de M. Poirier*; Anatole France, *le Livre de mon ami*; Balzac, *le Cure de Tours*; Bowen's *French Lyrics*. Lectures (2). 2 hours, throughout the year. Elective.

6. Spanish.—PROFESSOR HILLS AND MISS REINHARDT.

- A. *Elementary Course.*—Hills and Ford's *Spanish Grammar*; Hills' *Spanish Tales for Beginners*; Valera, *El Pajaro verde*; Alarcon, *El capitan Veneno*. Writing from diction, and practice in speaking. 3 hours, throughout the year. Elective.

7. Economics.—MR. CLARK. •

- A. *Elementary Economics.*—A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, supplemented by lectures and assigned readings. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law, or journalism, the general rules and principles contributed to business by the science of economics. First semester, 2 hours. Required of Freshmen.

8. Law.—MR. HALL.

- F. *Property.*—Real and personal property; ownership of land; natural servitudes; easements; covenants

as to use; public rights; franchises; rents and tenures; uses and trusts; joint ownership; estates; remainders and executory limitations; common law assurances and conveyances under the Statutes of Uses. Texts: 207 to 508, Chase's Blackstone; Gray's Cases on Property. 2 hours, throughout the year. Required of Juniors.

9. Forest Law.

The laws relating to the National Forests and the Public Domain. A thorough study will be made of "The Use Book" of the Forest Service. Cases pertaining to decisions affecting the National Forests. 3 hours, first semester. Required of Seniors.

10. Meteorology.—MR. ANGELL.

Elementary Meteorology.—Prerequisite, Elementary Physics. Text, Davis' Elementary Meteorology. First semester, 1 hour. Required of Seniors.

11. Engineering.—PROFESSOR LYON AND ASSISTANTS.

A. *Theory and Practice of Surveying*.—Construction, use and adjustment of instruments; pacing, use of chain, compass, level and transit; contouring and levelling by hand; cross-sections; theory of stadia measurements; azimuth traverse; balancing survey; mapping. Field problems are assigned on the basis of the students' field experience and future needs. Field work during the summer. Second semester. 2 recitations. Required of Freshmen. Fee, \$4.

A. F. *Advanced Surveying*.—Practical field and office work in topographical surveying and mapping. This work is taken up in connection with Course 28. See page 25. Required of Seniors.

L. *Roads, Pavements and Parks*.—Surveys and locations; drainage and grade; foundations; selection and treatment of materials; maintenance of roads and pavements; design, construction and maintenance of parkways. Lectures, recitations and assigned readings. Second semester, 2 hours. Required of Juniors.

12. Hydrography.—PROFESSOR LYON AND MR. FELLOWS.

A. *Forest Hydrography*.—The flow of streams, variations, effects of forest on flow, regimen of various rivers, underground water, gauging streams. 6 lectures. Required of Juniors.

B. *Reclamation*.—Irrigation economics and reclamation projects. 6 lectures. Required of Juniors.

I. *Water Supply*.—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of water-shed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. 3 hours' credit, first semester. Recitations, collateral reading and design work. Elective.

J. *Irrigation Engineering*. — Irrigation of land; amounts and periods of application; grades, cross-section and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return of seepage waters; irrigation by pumping. 2 hours' credit, second semester. Lectures, recitations and assigned reading. Elective.

13. Graphics.—PROFESSOR MOORE.

A. *Elements of Drawing*.—Includes elementary exercises to develop facility in the use of instruments, selected geometrical problems, cross-sections,

shading with right line and bow pens, conventional representations, mathematical curves; isometric, oblique and orthographic projections; working drawings, tracings; the form and proportions of standard letters, both free-hand and ruled; methods of spacing and laying out titles. First semester, 2 hours. Required of Freshmen.

NOTE.—Students are required to provide themselves with a good and complete set of drawing instruments, design and make to be approved by the instructor.

14. *Physics*.—PROFESSORS PARSONS AND WINKENWERDER.

A. *General Physics*.—Prerequisite, plain trigonometry.

(1) Three lectures and one recitation per week.

In these lectures the mathematical development of the subject will be emphasized.

(2) Two periods of two hours each of laboratory work, First semester; Mechanics, Heat, Sound: Second semester; Light, Magnetism, Electricity. Throughout the year, 8 hours. Required of second-year students.

B. *Timber Physics*.—Prerequisite course A, and elementary chemistry. The structure, mechanical, physical and chemical properties of wood. Exercises with the Riehle and Olsen machines in making compression, shearing, tension and transverse tests. Second semester, 4 hours. Required of Juniors.

15. *Chemistry*.—PROFESSOR STRIEBY.

B. *Advanced Chemistry*.—Prerequisite, high school chemistry. This course gives a general knowledge of chemistry. The second semester is devoted mainly to organic chemistry. The chief theories and laws are studied with reference

to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. Throughout the year, 3 hours recitation or lectures and 4 hours of laboratory work. Required of Sophomores.

C. *Qualitative Analysis*.—Prerequisite, Chemistry A or equivalent. Experimental drill in obtaining characteristic reactions of the more common elements, study of empirical formulæ and symbolic expression of reactions, solution of substances, separation of groups of elements, and finally analysis—first of simple salts and later of complex mixtures. The analytical work is confined almost wholly to inorganic substances, but includes certain common organic acids and a few organic bodies of general and medicinal use. 9 hours (counts 4.) Elective.

E. *Organic Chemistry*.—Prerequisite, Chemistry A or B. Remsen's *Organic Chemistry*. Lectures and discussions of special subjects and processes. 3 hours recitation and 3 hours laboratory work (counts 3 hours). Elective.

16. Geology.—PROFESSOR FINLAY.

A. *General Geology*.—Prerequisite, Elementary Chemistry. Dynamical and Structural Geology. Lec-

tures, laboratory work Tuesday and Thursday afternoons, and field excursions on Saturday mornings. First semester, 3 hours. Required of Sophomores or Juniors.

17. Rocks and Soils.—

The composition, classification and structure of common rocks. Soils—Their origin, chemical and physical properties, classification and relative values. First semester, 2 hours. Required of Juniors.

18. Biology.—PROFESSOR SCHNEIDER.

A. *General Biology*.—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution.

First semester: *Plant Studies*.—In the laboratory a comparative study is made of the cryptogams, beginning with the simplest forms. This is followed by a study of the structure of typical flowering plants.

Second semester: *Animal Studies*.—The laboratory work involves a study of representatives of the principal groups of animals.

Recitations or lectures, 2 hours; laboratory work, 4 hours. Throughout the year. Required of Freshmen.

J. *Plant Physiology*.—Prerequisites, Biology A and one year of Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First semester, 5 hours. Required of Sophomores or Juniors. Laboratory fee, \$3.00. Given in 1909-10 and alternate years.

K. *Botany of the Seed Plants*.—Prerequisite, Biology A. Adaptations, migration, distribution and successions are considered at length. Opportunity is also given the student to become proficient in the determination of plant species among gymnosperms and angiosperms. Field excursions for the purpose of studying the local plant geography. Second semester. Recitations or lectures, 2 hours; field or laboratory work, 4 hours (counts 3 hours). Required of Sophomores.

19. Entomology.—

A study of the life histories and habits of injurious insects, with special reference to insects that attack trees and forest products. Methods of identification and methods of combating. Natural enemies. A collection of representative species of insects properly named and labeled is required to be handed in to the instructor upon completion of the work. Second semester, 2 hours. Required of Seniors.

20. Forest Botany.—DEAN STURGIS AND PROFESSOR WINKENWERDER.

A. *Morphology and Growth of Woody Plants*.—The form and growth of trees, the special morphology of the organs of woody plants and their relations to each other and the general development of the plant. Lectures, laboratory and field work. Second semester, 4 hours. Required of Freshmen.

B. *Dendrology*.—The characteristics of the important timber trees of the United States, both in their winter and summer conditions. The systematic side of the subject will be developed, and special emphasis will be placed on distribution, both

geographical and as influenced by the local conditions. Text, Sargent's Manual of the Trees of North America. The Silvical and Planting Leaflets of the National Forest Service will be used for collateral studies. Lectures, field work, and assigned readings. First semester, 5 hours. Required of Sophomores.

NOTE—The identification of trees by means of bud and twig characters, though properly a part of Dendrology, will be begun in Forest Botany A in connection with the study of the morphology of buds and twigs. By this arrangement the characteristics of trees can be studied at all seasons of the year.

- C. *Diseases of Trees*.—Prerequisites, Biology A and J. Lectures and laboratory work on injuries to trees caused by parasitic fungi. Also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological vegetable physiology. Second semester, 2 hours. Required of Sophomores.

21. Silviculture.—PROFESSOR WINKENWERDER.

- A. *Silvics*.—The life histories of trees and the relations of trees to their environment. Special reference is made to the influence of temperature, light, moisture and soils on tree growth. The relations of trees to each other in the forest. Injuries to forests and forest trees. Lectures and field work. Summer term. Required of Freshmen.
- B. *Methods in Silviculture*.—Prerequisite, Silviculture A. The improvement of the forest through use and proper treatment. The reproduction of trees,

the form and growth of stands, methods of thinning for improvement and reproduction; and silvicultural systems of management. Lectures and field work. Second semester, 2 hours. Field work additional. Required of Sophomores.

C. *Field Work in Silviculture*.—A critical study of the work done in the forest at Manitou Park. Extensive exercises in marking trees for improvement and reproduction cutting. Inspection of the nurseries at the Planting Station on the Pike National Forest Reserve and a general study of the silvicultural work done on the National Reserve. The inspection work will be written up in the form of reports. Summer Course. Required of Sophomores.

D. *Forest Extension*.—The establishment of forests through artificial regeneration. Methods in nursery work, in direct seeding, in planting, and in the care of plantations. Each student will be required to prepare a planting plan for a portion of Manitou Park. Lectures and field work. Second semester, 4 hours. Required of Juniors.

22. Forest Mensuration.—PROFESSOR WINKENWERDER.

A. *General Study*.—The use and construction of log rules; the determination of the contents of logs in board, standard, volumetric, and cord measure; the contents of standing trees; the increment in diameter, height and volume of single trees and whole stands. The construction and use of volume and yield tables; the determination of the age of single trees and stands. Methods of timber estimating. Lectures and field work. Summer Term. Required of Freshmen. Text: Graves' Forest Mensuration.

23. Forest Management.—PROFESSOR WINKENWERDER.

A. *Mensuration*.—Mensuration in its special applications to forest management. Review of Mensuration A, and special applications to extensive timber tracts. Summer Course, 2 lectures; field work assigned. Required of Sophomores.

B. *Forest Protection*.—The methods of economic protection of forests. European and Indian methods and their conditions as compared with our own. Summer Course, 2 lectures; field work at Manitou Park and inspection work on the Pike National Forest as assigned. Required of Sophomores.

C. *Forest Policy*.—The economic principles underlying the management of forests with special reference to private, State and National forest property. First semester, first six weeks, 4 hours. Required of Seniors.

D. *Forest Valuation*.—The determination of the financial results of forest management. The present and future value of forest property based on productive power. The taxation of forest lands. Lectures and assigned readings. First semester, last 10 weeks, 4 hours. Required of Seniors.

E. *Forest Regulation*.—A critical study of working plans for forest property in Europe, India and the United States. Methods used to secure sustained productiveness. Field methods, forest description, protection, utilization and administration. Second semester, 4 hours.

24. *State Work in Forestry*.—

History and development of State Work in Forestry. State forest policies, laws; State associations. Forest work in the various states.

Special attention will be given to the States of New York, Pennsylvania, Maine, Michigan, Wisconsin, Minnesota, California, Indiana, Kansas and Colorado. Second semester, 3 hours. Required of Seniors.

25. History of Forestry.—

A brief discussion of the development of methods in forestry and of the organization of the National and State forest policies in Europe, India and the United States. First semester, 3 hours. Lectures and assigned readings. Required of Seniors.

26. Forest Geography.—

The forest regions of the United States. The more important forest types of the country with special reference to the influences determining their local distribution. The best methods of silvicultural treatment. The forest products and the chief centers of their manufacture, distribution, and consumption. The National Forests will receive individual consideration in their relation to the forests, the forest resources and the water supply of the country. Lectures and assigned readings. Required of Juniors second semester, 4 hours; and of Seniors first semester, 3 hours, second semester 4 hours.

27. *Forest Products*.—PROFESSOR WINKENWERDER.

A. Minor Forest Products.—The methods of harvesting and manufacturing forest products exclusive of lumber. Special attention will be given to the wood pulp, naval stores, tanning, charcoal, maple sugar, wood alcohol and wood vinegar industries, and to methods of wood preservation.

B. Lumbering.—PROF. WINKENWERDER and Special Lecturers.

- (1) *Lectures*.—The development of the lumber industry in the United States. The status of the lumber industry as compared to other industries. The movement of the lumber industry westward and southward. Typical operations in the woods and at the mills in different parts of the country. The business side of the lumber industry. First semester, 3 hours; second semester, 4 hours. Required of Seniors.
- (2) *Field Work*.—A study, with detailed report, of the logging and milling operations now being carried on at Manitou Park and on the Pike National Forest. In this work special emphasis will be placed upon scaling and methods of transportation, roads, disposal of brush, contracts for sale of timber and methods for checking the cut. Summer Course. Required of second-year students.

NOTE.—There will be several special lectures by local lumbermen who are carrying on logging operations in the Rocky Mountains. The Juniors are also urged to spend the Christmas recess studying the details of some large operation.

28. The Practice of Forestry.—PROFESSOR WINKENWERDER and assistants.

During the fore part of April the work of the Seniors will be transferred to Manitou Park, where field work in topographic surveying, estimating timber, forest mapping, road building and fireline construction will be carried on. Plans, with estimated cost and revenues, will also be made for lumbering all areas from which the timber is to be cut during the succeeding year.

SUMMER TERM.

The work of the Summer Term will be conducted at the School Forest at Manitou Park.

The term opens about June 4 and closes about August 1. The work of the Freshman Class will be devoted to Surveying, Silviculture and Mensuration. The Sophomores will have lectures and field work in Forest Protection, Lumbering, and Road, Bridge and Trail construction.

GRADUATE COURSE.

1. *Minor Forest Products*.—Assigned readings. Laboratory and field studies covering the industries using forest products other than lumber. The following industries will receive special attention: Wood pulp and paper, naval stores, tan bark and tan extract, charcoal, maple sugar, wood alcohol, and wood vinegar.

A student who intends to follow this course is advised to elect chemistry in his under-graduate course.

2. *Lumbering*.—Assigned readings. Field studies including the forest conditions and methods of logging and milling in each of the forest regions of the country. At the outset at least two months will be spent with one large lumber company. The remaining six or seven months will be spent with lumber companies in other forest regions of the country. Beside the general outline for study others will be furnished the student in this course covering special problems in machinery, transportation, taxation, wood preservation and the utilization of waste.
3. *Forest Extension*.—Assigned readings. Field studies in nursery work, seeding, planting, natural methods of reforestation, and the care of plantations. The work will include a study of the large commercial nurseries, the State nurseries, and the nurseries of the Forest Service; methods in afforestation in the prairie states;

methods of reforestation as carried on in the forests of the country by private individuals, by corporations, by the various states and by the federal government; a study of typical plantations, cost of establishing, cost of maintenance, and profits.

4. *Forest Management*.—Assigned readings. A field study of the problems in management as illustrated by forest tracts that are being administered according to conservative methods by private individuals, by hunting and fishing clubs, by corporations, by the various states and by the federal government. Special attention will be directed toward methods of protection, the silvicultural systems used, rotation, yield, market conditions, transportation, labor, and organization.

For students who so desire, the itinerary for this course may be so arranged that a part of the required time may be spent in Europe.

RANGER COURSE.

1. *Forest Measurements*.—MR. W. J. MORRILL.

Log rules, the determination of the contents of logs, single trees and whole stands. Log scaling, the use of volume tables, methods of estimating. Lectures and practice work.

2. *Forest Botany*.—PROFESSOR WINKENWERDER and MR. MORRILL.

Simple tree botany. The principles of nutrition, reproduction and growth. The classification of plants and the use of botanical keys. The genera and species of Rocky Mountain trees. Lectures, laboratory work and field excursions.

3. *Diseases of Trees*.—DEAN STURGIS.

A short course of lectures on the local fungus-diseases; symptoms of attack, life-histories, and methods of control.

4. *Forest Entomology*.—MR. W. J. MORRILL.

A short course of lectures on insects injurious to forest trees of the Rocky Mountain region; symptoms, life-histories and methods of control.

5. *Geology and Mining*.—DR. FINLEY and PROFESSOR GRISWOLD.

A study of common rocks and soils. Mining in Colorado, lode and placer claims; the use of the gold pan. Lectures and demonstrations.

6. *Surveying*.—PROFESSOR WINKENWERDER and MR. W. J. MORRILL.

The calculation of areas. The use of the chain, compass, traverse board and handlevel. Pacing survey, location of boundaries, location and building of trails; methods in mapping. Lectures, demonstrations, and practical work.

7. *Forestry in the United States*.—PROFESSOR WINKENWERDER.

Four lectures. History of the forest movement in the United States, the general importance of the movement, and forest influences as related to the U. S.

8. *Meteorology*.—MR. C. M. ANGELL.

Lectures and demonstrations in the method of reading and recording weather observations.

9. *Silviculture*.—MR. W. J. MORRILL.

The relations of trees to light, moisture, temperature, and soil. The silvical characters of the Rocky Mountain species; methods of reproduction and protection; systems of marking and cutting; seeding habits, seed collecting, nursery practice and planting. Lectures and field work.

10. *Lumbering*.—MR. W. J. MORRILL.

Cutting, skidding and piling logs. Scaling. Logging roads and mill sites. Methods of piling and burning brush. Factors determining the cost of each part of the operation. Common grades of lumber.

11. *Forest Administration*.—MR. F. W. MORRELL.

Organization of the Forest Service; duties and qualifications of forest officers; permits and privileges; fiscal matters, reports, use of forms, supervision of work. Lectures.

12. *Forest Law*.—MR. CATES.

A study of "The Use Book," typical cases, collecting evidence, reporting evidence.

13. *Grazing and Live-stock*.—MR. CLOS.

Grazing policy, breeds of cattle, brand reading, use and care of the range.

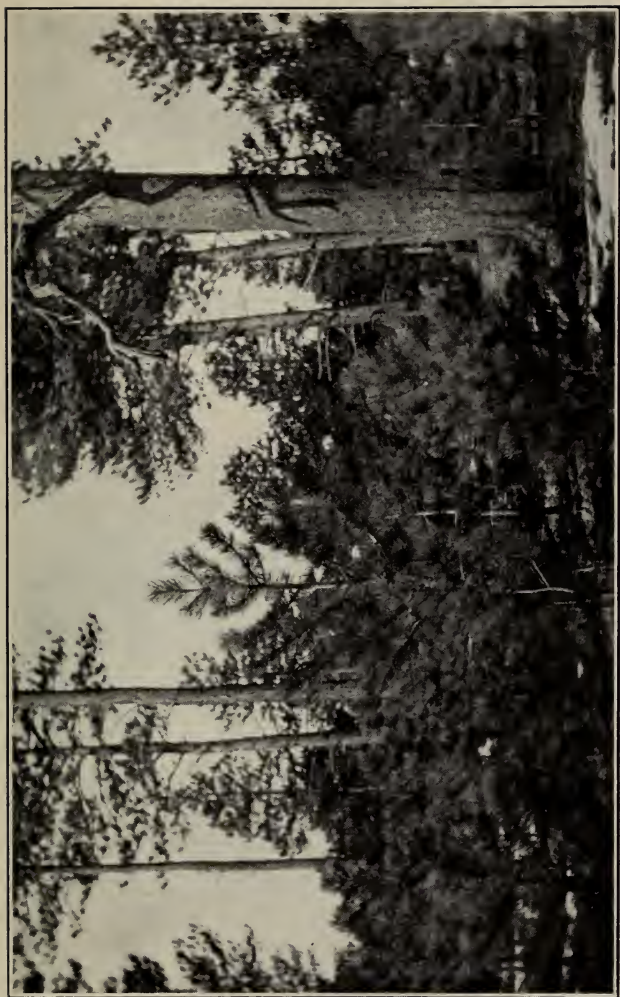
14. *First Aid to the Injured*.—DR. STOUGH.

Simple methods of caring for injuries and wounds. The treatment of shocks, hemorrhages, cuts, bruises and burns.

15. *Packing, Camping and Horsemanship*.—MR. YARNELL.

Demonstrations in the use of the pack saddle, making ties and hitches; camp fires, tents, provisions. Lectures and demonstrations in horseshoeing and the care of horses.

NOTE—During the first half of the course the rangers will meet at Palmer Hall in Colorado Springs, and the work will consist chiefly of lectures. The remainder of the time will be spent in practice work at Manitou Park.



Varying Ages of Trees.



The Winter Cottage, Manitou Park.



Students Making Growth Studies.



Cottage, Manitou Park.



A Part of the School Forest at Manitou Park.

C
71c26
511/12
I

COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 55

BULLETIN SERIES NO. 39

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

ANNOUNCEMENT COLORADO SCHOOL OF FORESTRY

COLORADO SPRINGS, COLORADO
APRIL, 1911

Published by authority of the Board of Trustees of Colorado College every six weeks
during the Academic Year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado,
under Act of Congress for July 16th, 1904.

COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 55

BULLETIN SERIES NO. 39

ANNOUNCEMENT

COLORADO SCHOOL OF FORESTRY

COLORADO SPRINGS, COLORADO

APRIL, 1911

Published by authority of the Board of Trustees of Colorado College every six weeks
during the Academic Year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado,
under Act of Congress for July 16th, 1904.

CALENDAR

1911.

Jan. 3—	CHRISTMAS RECESS ENDS at 8:15 a. m.....	Tuesday
Jan. 20—	Mid-Year Examinations begin.....	Friday
Jan. 27—	Trustees' Day	Friday
Jan. 30—	SECOND HALF-YEAR BEGINS at 8:15 a. m.....	Monday
Feb. 12—	Day of Prayer for Colleges.....	Sunday
Feb. 22—	Washington's Birthday: a holiday.....	Wednesday
Mar. 11—	Condition Examinations begin at 8:15 a. m.....	Saturday
Mar. 21—	Last day for registering for Hawley and Mary G. Slocum scholarships.....	Tuesday
Mar. 25—	SPRING RECESS BEGINS at 1 p. m.....	Saturday
Apr. 4—	SPRING RECESS ENDS at 8:15 a. m.....	Tuesday
Apr. 14—	Good Friday: a holiday.....	Friday
May 30—	Memorial Day: a holiday.....	Tuesday
June 2—	Examinations begin	Friday
June 5—	Summer School of Surveying opens in Manitou Park.....	Monday
June 11—	Baccalaureate Sermon	Sunday
June 12—	Class Day	Monday
June 13—	Annual meeting of Board of Trustees.....	Tuesday
June 14—	COMMENCEMENT	Wednesday
Sept. 12—	Residence Halls open.....	Tuesday
Sept. 12—	Registration	Tuesday
Sept. 13—	FIRST HALF-YEAR BEGINS at 8:15 a. m.....	Wednesday
Sept. 23—	Condition Examinations begin at 8:15 a. m.....	Saturday
Oct. 14—	Last day for registering for post-graduate work...	Friday
Oct. 25—	Insignia Day	Wednesday
Nov. 30—	Thanksgiving Day: a holiday.....	Thursday
Dec. 22—	CHRISTMAS RECESS BEGINS at 5 p. m.....	Friday

1912.

Jan. 9—	CHRISTMAS RECESS ENDS at 8:15 a. m.....	Tuesday
Jan. 19—	Mid-Year Examinations begin.....	Friday
Jan. 26—	Trustees' Day	Friday
Jan. 29—	SECOND HALF-YEAR BEGINS at 8:15 a. m.....	Monday
Feb. 11—	Day of Prayer for Colleges.....	Sunday
Feb. 22—	Washington's Birthday: a holiday.....	Thursday
Mar. 9—	Condition Examinations begin at 8:15 a. m.....	Saturday
Mar. 19—	Last day for registering for Hawley and Mary G. Slocum scholarships.....	Tuesday
Mar. 30—	SPRING RECESS BEGINS at 1 p. m.....	Saturday
Apr. 9—	SPRING RECESS ENDS at 8:15 a. m.....	Tuesday
May 30—	Memorial Day: a holiday.....	Thursday
May 31—	Examinations begin	Friday
June 9—	Baccalaureate Sermon	Sunday
June 10—	Class Day	Monday
June 11—	Annual meeting of Board of Trustees.....	Tuesday
June 12—	COMMENCEMENT	Wednesday

FACULTY

WILLIAM FREDERICK SLOCUM, D. D., LL. D.*
President.

WILLIAM CODMAN STURGIS, PH. D.*
Dean and Lecturer on Vegetable Pathology.

PHILIP TRIPP COOLIDGE, M. F.*
Director and Professor of Forestry.

ELWOOD IDELL TERRY, S. B.
Instructor in Forestry.

EDWARD CHRISTIAN SCHNEIDER, PH. D.*
Head Professor of Biology.

FLORIAN CAJORI, PH. D.
Head Professor of Mathematics.

FREDERIC ALEXANDER BUSHEE, PH. D.
Professor of Political Economy.

GEORGE IRVING FINLAY, PH. D.
Head Professor of Geology.

ELIJAH CLARENCE HILLS, PH. D., LITT. D.
Head Professor of Romance Languages and Literatures.

GEORGE MAXWELL HOWE, PH. D.
Professor of German.

JOHN MILLS, A. M., B. S.
Professor of Physics.

WILLIAM STRIEBY, A. M., E. M.
Head Professor of Chemistry.

HOMER EDWARDS WOODBRIDGE, A. M.
Professor of English.

HOWARD MOORE, C. E.
Assistant Professor of Graphics.

GEORGE EARL MARTIN, B. S.
Instructor in Civil Engineering.

YNA REINHARDT, A. M.
Instructor in Spanish.

*Member of the Governing Board.

COLORADO SCHOOL OF FORESTRY

Forestry as a Profession

The increasing demand for the practice of Forestry throughout the United States on both public and private lands is the result of the rapid depletion of our forests. Changes in methods of lumbering, better forest fire protection, and the reforestation of denuded areas are urgently needed, if there is to be a timber supply in the future, and if the sources of the waters now used for domestic purposes, power and irrigation are to be protected. These reforms can be secured only by wide dissemination of knowledge of Forestry among timberland owners, such education of the people as will result in better legislation, and the wisest administration of all forest lands, whether publicly or privately owned. The present and future prosperity of our growing population imposes on us now the problem of securing the wisest use, in the long run, of regions valuable chiefly for timber or grazing, or as a source of water. Whether for educational work in the broadest sense, or for administrative work, the future of our forests demands men who have both a broad, liberal education and sound technical training. The lack of the one means a lack of true co-ordination of Forestry with other affairs, and the lack of the other means inability to do satisfactory professional work. A thoroughly trained technical forester must have complete detailed knowledge of his subject and abundant drill in its methods.

No profession offers greater opportunities for individual success through public service than Forestry. Yet success in this work can be won only by conscientious and unstinted devotion. The discomforts due to weather or isolation in the field are unfailing tests of the forester's capacity for success.

Forestry should not be selected as a profession except by those with enthusiasm for the work and with sound health. No

man can expect to prepare himself for Forestry unless he is ready for the hard study which masters detail and for the rough life of the woods. Since the value of a liberal education in any profession is unquestioned, it is strongly urged that Forestry be made a graduate rather than an undergraduate study by all who can so afford.

Organization of the School

The Colorado School of Forestry was established as a department of Colorado College in the spring of 1905. The foundation was laid through the generosity of General W. J. Palmer and Dr. W. A. Bell, who presented the College a tract of 10,000 acres of timber land known as Manitou Park.

Catalogues may be obtained from the Secretary of Colorado College. For additional information application should be made to The Director, Colorado School of Forestry, Colorado Springs, Colorado.

Object

The chief aim of the School is to give to students who intend to adopt Forestry as a profession a thorough training which will fit them for positions in the Government Forest Service, or as State Foresters, teachers of Forestry, or expert foresters in private employ.

Advantages and Equipment

The Colorado School of Forestry is unusually well prepared to fit men for administrative work on the National Forests. It is a department of a college of the highest standing in the West, and its students are therefore enabled to obtain thorough training in English, Mathematics, Languages, and other fundamental subjects. Its location in the National Forest region makes it possible to give its students first-hand instruction in the administrative work on the National Forests, such as timber cruising, timber sales, planting and nursery

work, grazing, special uses, etc. Furthermore, the School has the double advantage of giving Western young men opportunity to study at home and of giving Eastern young men who wish to secure positions on the National Forests of the West opportunity to become familiar with Western habits of thought and life during their college years. The fact that one-third of the number of students come from east of the Mississippi River indicates the national reputation of the School. The School is excellently prepared to give the necessary instruction as to the administrative relations of the Forest Service to the grazing business, the mining business, and other enterprises characteristic of the West. Its location near the National Forest makes it possible to secure the frequent aid of Forest Service officers for lectures or instruction. Reference to the detailed descriptions of the courses in Lumbering, Forest Extension, and Practice of Forestry will indicate the possibilities of work on the National Forests.

Besides the many advantages afforded by the location and the ideal climate of Colorado Springs, the students have all the advantages accorded to the students of Colorado College. These include Scholarships; the College Library; the large and well-equipped laboratories of the Departments of Biology, Geology, Physics, Chemistry, and the School of Engineering; the Museum; the Literary Societies; the College Lecture Course; and the use of Dormitories and Boarding Clubs. For further information on any of these points, see the catalogue of Colorado College or address the Director of the School of Forestry.

Experiments are in progress at Manitou Park, in co-operation with the Forest Service, for the study of natural reproduction and other silviculture characteristics of Rocky Mountain forests.

The largest forest nursery maintained by the Forest Service in the Rocky Mountain States is at Monument, within a half hour's ride by railroad; and the Fremont Experiment

Station of the Forest Service near Manitou is within walking distance of the street car line.

A Foresters' Club meets fortnightly to consider current events in forestry and to discuss papers of professional interest.

FOREST NURSERIES.

An excellent site has been obtained by the School in Colorado Springs for a forest nursery. The plot is large enough to give the students ample practice in nursery methods. It is located on the banks of Monument Creek within ten minutes' walk of the main buildings of the College.

Space in a greenhouse owned by a large floral company in Colorado Springs has been obtained for experimentation in the germination of forest tree seeds.

THE WOOD TESTING LABORATORY.

A room in the Mechanical Laboratories building has been assigned for the testing of materials of construction. Here are mounted a 100,000-pound Riehle testing machine for making tension, compression, shearing and transverse tests, and an abrasion cylinder for testing paving material; both machines are driven by a five-horsepower Crocker-Wheeler motor. In addition to other accessory apparatus, a Henning extensometer is available for tension tests and an Olsen compression micrometer for compression tests, each instrument reading to one ten-thousandth of an inch. Each student is required to make a series of tests upon the resisting properties of various species of commercially important woods. Tests made from time to time for local manufacturers and others, bring the students into close touch with practical work of this sort.

MANITOU PARK—THE FIELD LABORATORY.

Manitou Park is a tract of 10,000 acres situated twenty-seven miles from Colorado Springs and about eighteen miles north of Pike's Peak. It is reached by the Colorado



STUDENTS MARKING TREES TO BE CUT, VIRGIN WESTERN YELLOW PINE FOREST



CONSERVATIVE LUMBERING AT MANITOU PARK—YOUNG TREES LEFT FOR FUTURE
GROWTH—BRUSH PILED FOR BURNING

Midland Railroad to Woodland Park, twenty miles, and then by stage, seven miles. It is within the boundaries of the Pike National Forest. Camp Colorado, a group of cottages recently remodeled in conjunction with the School of Engineering, make a most convenient and home-like center for the Summer Courses.

The Park is under the direct supervision of the School of Forestry. It affords unusual opportunities for study and practical experience in the field. About two-thirds of its area is covered with a good stand of Western Yellow Pine and Douglas Fir. Much of the timber is mature, and logging and milling operations are now being carried on. An abundant young growth is replacing the timber that is being removed. The rich land along a stream which waters the valley offers an excellent opportunity for the establishment of nurseries and the study of tree planting. The forest is being brought into the best possible producing condition. The students are given opportunity, under the direction of the Forestry Faculty, to take part in all the phases of the treatment and management of the forest. The class of 1910, as instruction in the Practice of Forestry (p. 20), prepared a detailed working plan for the timber land. This plan is being executed and revised by subsequent classes. The School has a good working equipment of axes, saws, calipers, surveying instruments, meteorological instruments, and such other apparatus as is needed in the study and care of the forest.

Duration and Arrangement of Courses

THE UNDERGRADUATE COURSE.

Before registering, each candidate must present to the Director a certificate of moral character signed by some responsible citizen in the place which he has made his home. The scholarship requirements for entrance are the same as those of the School of Engineering (p. 28). Credit will be given for

parallel studies pursued at other institutions of high standing upon presentation to the Director of certificates that such studies have been satisfactorily completed. A fee for late registration will be charged, as in the College of Arts and Sciences.

The undergraduate course covers four regular college years and a total of three months of field work. The field work may be taken in two or three summers following Freshman, Sophomore or Junior years. Although only one course in English is ordinarily required, it is expected that students will be able to write correct and concise English in their technical work, and, at the discretion of the Director, students who are deficient in capacity for expression in good English will be required to take additional courses. Two years of modern language are included in the course. These must both be German, unless a part of this requirement was satisfied in German presented for entrance. One year each of College Chemistry and Physics is required. Biology 4 and 7a are also recommended, but cannot be substituted for the required courses. Courses must be taken in the sequence arranged in the catalogue, and failure to pass prerequisite courses will bar students from advanced courses. The presentation of a thesis is recommended.

The passing grade in all forestry subjects is seventy (C). A grade below sixty (E) is a failure, from sixty to sixty-nine (D), inclusive, is a condition. A condition may be removed by a subsequent examination. A failure means that the subject will have to be taken up again in a regular class. Any student who fails to carry two-thirds of the work for a semester is liable to suspension from the course.

Students who successfully complete the full course will be awarded the degree of Forest Engineer.

It is recommended that students who are planning to work their way, in large part, through the School of Forestry, take five years for their course.

THE GRADUATE COURSE.

Students who have been awarded a degree other than that of Forest Engineer, either at Colorado College, or at other institutions of high standing, will be awarded the degree of Master of Forestry upon completion of courses equivalent to those required for the degree of Forest Engineer in Trigonometry, Graphics, Civil Engineering, Botany, Climatology and Meteorology, Geology, and all courses in Forestry. Students who enter Colorado College with the intention of obtaining the degrees of Bachelor of Arts and Master of Forestry should be able to complete their course in five or six years. Such candidates for the degree of Bachelor of Arts should, while students in the College of Arts, major in Science. Graduates of other institutions who are candidates for the degree of Master of Forestry should, if they are well grounded in science, be able to obtain this degree in two years. Students of other institutions who have not studied Forestry cannot hope to obtain the degree of Master of Forestry in less than two years.

On account of the increasing demand that the technical forester have a broad, liberal education, the course leading to the degree of Master of Forestry is strongly recommended.

THE SUMMER COURSE.

The Summer Course is given in Manitou Park during a period of from four to eight weeks. It is a part of the required work. The course is well adapted to meet the needs of students in other Schools of Forestry, and to all such are given certificates of attendance for all work satisfactorily completed. Students occupy tents and cottages, furnishing their own bed-linen and blankets.

THE RANGER COURSE.

For two years the Ranger Course was a successful and greatly appreciated department of the work of the Colorado

School of Forestry. Last year sixty rangers were detailed by the Forest Service from the National Forests in Colorado, Wyoming and other adjacent states to attend this course. Unfortunately, the decision of the Attorney General of the United States, that it is contrary to law for the Forest Service to pay salaries to its employes while receiving this kind of instruction, has made it impossible, for the present, for the Forest Service to co-operate with Colorado College in giving a Ranger Course.

The Colorado School of Forestry intends, however, to give a Ranger Course with its own faculty, as a regular part of its instruction. As soon as definite arrangements for this course have been made, descriptive information concerning it will be published.

EXPENSES.

Tuition:

Regular Course, for full year (ten months)	\$60.00
Summer Course alone (four weeks)	12.00
Matriculation	5.00
Graduation	5.00

Annual Fees:

Library fee	\$3.00
Athletic fee	4.00

This does not include the small special fee charged in certain of the prescribed laboratory courses, nor does it include the railway and stage fares to and from Manitou Park or to points on the National Forests.

Tuition bills are payable to the Treasurer of Colorado College. Students who are registered in departments of Colorado College other than the School of Forestry and who take courses in Forestry will be charged fees at the discretion of the Director.

Board:

In young men's clubs, a week	\$3.50 to \$5.00
In the City, a week	4.00 to 8.00
Summer Course, board and lodging, week	4.00 to 4.50

Furnished Rooms:

In College Dormitory,* by the year . . . \$40.00 to \$80.00

In the City, by the month from \$7.00 up

Laboratory Fees:

Biology 1 or 4	\$2.50
Biology 2 or 7 (a)	3.00
Biology 3	1.00
Chemistry 1	7.00
Physics 2	4.00
Geology 2	3.00
Engineering 201	4.00
Engineering 241	5.00
Practice of Forestry	4.00

Average a year for required courses, about 8.00

Text Books:

Of the more important books which treat of technical forestry, duplicates for the use of students will be found in the library. The following standard books must be purchased by each student:

Forest Mensuration.—*Graves*.

History of Forestry.—*Fernow*.

Manual of the Trees of North America.—*Sargent*.

Principles and Practices of Surveying.—*Breed and Hosmer*.

Surveying Manual.—*Pence and Ketchum*.

Studies in Forestry.—*Nisbet*.

Principles of Handling Woodlands.—*Graves*.

It is also advised that students secure Fernow's Economics of Forestry, and Schlich's Manual of Forestry (Vols. II. and III.).

PRACTICAL EXPERIENCE.

Students are urged to use their summer vacations as much as possible in practical work in Forestry, as on the National Forests or in the employ of lumber companies.

*Students furnish towels and bed linen.

Undergraduate Course of Study

FRESHMAN YEAR.

<i>First Half-Year.</i>	Credit hours per week.	<i>Second Half-Year.</i>	Credit hours per week.
Mathematics 1	3 or 4	Mathematics 2	2
Modern Language	3	Mathematics 3	3 or 4
English 1	3	Modern Language	3
Biology 1	3	English 1	3
Forestry 1	1	Biology 1	3
Graphics	1	Civil 1	2
	14 or 15		16 or 17

SUMMER COURSE.

(Following Freshman or Sophomore Year.)

Civil 201.—Four weeks at Manitou Park, credit 4 hours.
Prerequisite, Mathematics 1, 2, and 3.

SOPHOMORE YEAR.

<i>First Half-Year.</i>	Credit hours per week.	<i>Second Half-Year.</i>	Credit hours per week.
Physics 2	4	Physics 2	4
Chemistry 1 or 2	3	Chemistry 1 or 2	3
Biology 2	(3)	Biology 3	3
or Geology 1	(3)	Modern Language	2
Modern Language	3	Political Science 2	3
Political Science 1	3	Meteorology and Climat- ology	1
	16		16

SUMMER COURSE.

(Following Sophomore or Junior Year.)

Forest Mensuration 1.—Four weeks at Manitou Park,
credit 4 hours.

Civil 241.—Two weeks in Manitou Park, credit 2 hours.

Field Work in Silviculture, two weeks, credit 2 hours.

JUNIOR YEAR.

<i>First Half-Year.</i>	Credit hours per week.	<i>Second Half-Year.</i>	Credit hours per week.
Biology 2	(3)	Physiography	1
or Geology 1	(3)	Dendrology	3
Civil 5	2	Silviculture	1
Economics 1	2	Forest Extension	1
Dendrology	3	Forest Protection	3
Wood Technology	4	Minor Forest Products... 1	
Silviculture	2	State Forest Law..... 2	
—		Elective*	3
	16		—
			15

SENIOR YEAR.

The first half of Senior year ends March 1.

<i>First Half-Year.</i>	Credit hours per week.	<i>Second Half-Year.</i>	Credit hours per week.
Forest Geography	5	Grazing	1
Federal Forest Law..... 2		Roads and Trails..... 1	
Forest Management	3	The Practice of Forestry.. 8	
Lumbering 1	3	—	
Lumbering 2	2		10
History of Forestry..... 2			
—			
	17		

NOTE.—All courses other than forestry courses included in either the graduate or the undergraduate work must be completed before the student will be admitted to the final year.

Description of Courses

COURSES IN FORESTRY.

Introduction to Forestry.—PROFESSOR COOLIDGE. A general survey of forestry. The forest as a natural resource; the relation of the forest to climate and water-supply; the natural history of the forest; the forests of

*Courses in Biology, Geology or Civil Engineering are recommended.

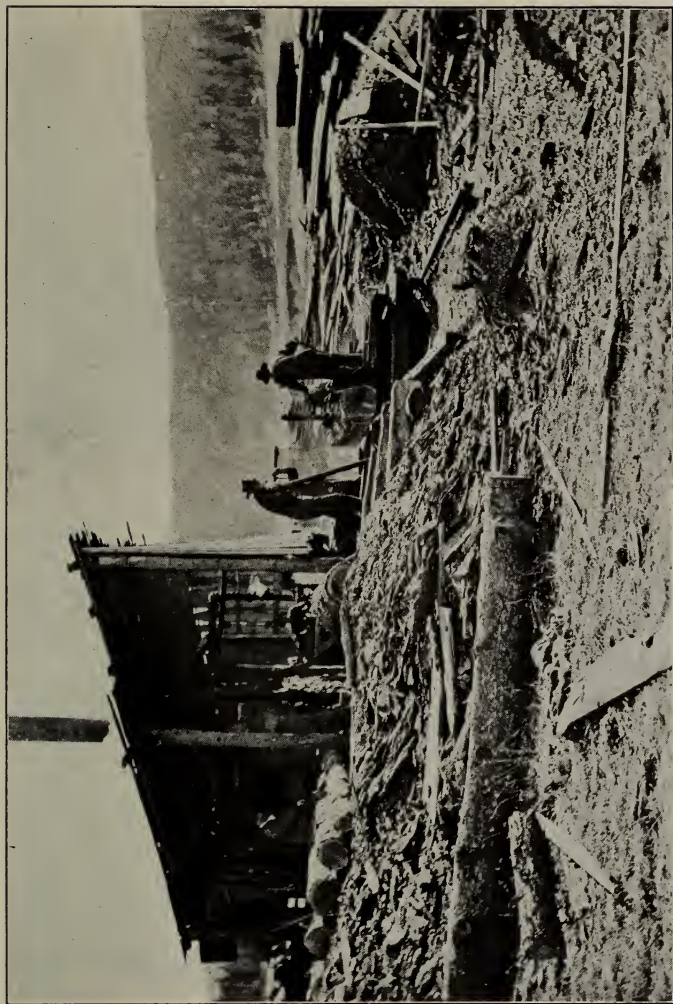
the United States; the products of forests; principles underlying the practice of forestry; the forestry movement in the United States; problems to be solved in the United States; the practice of forestry by private owners, by the United States, and by the various States; forestry as a profession. Lectures and required reading. First half of Freshman year, 1 hour a week.

Meteorology and Climatology.—MR. TERRY. Prerequisite, Elementary Physics. Texts, Davis's Elementary Meteorology; Hann's Handbook of Climatology. Climate of the United States. Lectures, recitations, and reports. Second half, Sophomore year, 1 hour a week. This course must be taken after or simultaneously with Physics 2.

Dendrology.—MR. TERRY. The characteristics of the important timber trees of the United States, in both their winter and summer conditions. The systematic side of the subject will be developed, and special emphasis will be placed upon distribution, both geographical and as influenced by the local conditions. A bud key will be prepared by each student for identification of trees in winter condition. Text, *Sargent's Manual of the Trees of North America*. The Silvical and Planting Leaflets of the Forest Service will be used for collateral studies. Lectures, field work, and assigned readings. Sophomore year, 3 hours a week throughout the year. Prerequisite, Biology 1 and 3.

Silviculture.—MR. TERRY. The life histories of trees and the relations of trees to their environment. Special reference is made to the influence of temperature, light, moisture, and soils on tree growth. The relations of trees to each other in the forest. Injuries to forests and forest trees.

The improvement of the forest through use and proper treatment. The reproduction of trees, the form and growth of stands, methods of thinning for improvement and reproduction; silviculture systems of management. The students have the opportunity of becoming familiar with the experiments in silviculture conducted by the Forest Service at its Experiment Station near Manitou. Junior year, 2 hours a week; lectures or recitations throughout the year; assigned reading, field work, and reports. Pre-



SAWMILL AT MANITOU PARK







STUDENTS' QUARTERS, CAMP COLORADO



INSTRUCTION IN PACKING

requisite, Dendrology. Biology 2 must be taken either previously or simultaneously.

Forest Extension.—PROFESSOR COOLIDGE. The establishment of forests through artificial regeneration. Methods in nursery work, in direct seeding, in planting, and in the care of plantations are considered. Each student is required to prepare a planting plan for a portion of Manitou Park. Space in a greenhouse has been secured from a floral company in Colorado Springs for experimental study of the germination and development of seeds of various tree species. It has been possible in the past, and may continue to be, to have each student work for a few days in the Forest Service Nursery at Monument, Colo., and to plant trees in that vicinity. (Monument is a half-hour's railroad ride from Colorado Springs.) Lectures, assigned reading, field work, and reports. Second half, Junior year, lectures or recitations, 2 hours a week. Prerequisite, Silviculture.

Field Work in Silviculture.—MR. TERRY. A critical study of the work done in the forest at Manitou Park. Extensive exercises in marking trees for improvement and reproduction cuttings. A general study of the silviculture work done on the Pike National Forests will be made. The inspection work will be written up in the form of reports. *Summer Course*, following Sophomore or Junior Year, 2 weeks at Manitou Park, credit 2 hours. Prerequisite, Silviculture.

Forest Mensuration.—MR. TERRY. The use and construction of log rules; the determination of the contents of logs in board, standard, volumetric, and cord measure; the contents of standing trees; the increment in diameter, height and volume of single trees and whole stands. The construction and use of volume and yield tables; the determination of the age of single trees and stands. Methods of timber estimating, and application to extensive tracts. Lectures and field work. Text, Graves' *Forest Mensuration*. *Summer Course*, following Sophomore or Junior year, 4 weeks, credit 4 hours. Prerequisite, Mathematics 1, 2, 3; Civil 1 and 201.

Wood Technology.—PROFESSOR COOLIDGE and MR. MARTIN. The structural, mechanical, physical, and chemical properties of wood, including timber-testing on Olsen and Riehle machines. The identification of the more important commercial woods. First half, Junior year, 1 hour. Lectures 2 hours, laboratory work 4 hours a week, credit 4 hours. Prerequisite, required Biology courses, Dendrology and Physics 2.

Minor Forest Products.—PROFESSOR COOLIDGE. The methods of harvesting and manufacturing forest products exclusive of lumber. Special attention will be given to the wood pulp, naval stores, tanning, charcoal, maple sugar, wood alcohol and wood vinegar industries, and to methods of wood preservation. Lectures, second half, Junior year, 1 hour a week. Prerequisite, Wood Technology.

Forest Protection—

Diseases of Trees.—PROFESSOR COOLIDGE and DR. STURGIS. Prerequisites, Biology 1 and 2. Lectures and laboratory work on injuries to trees caused by parasitic fungi. Also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological vegetable physiology. Assigned reading, lectures, and examinations. Second half, Junior year, 2 hours a week.

Forest Entomology.—MR. TERRY. A study of the life histories and habits of injurious insects, with special reference to insects that attack trees and forest products. Methods of identification and methods of combating. Natural enemies. A collection of representative species of insects properly named and labeled is required to be handed in to the instructor upon completion of the work. Lectures. Second half, Junior year, 2 hours a week. Prerequisite, required Biology courses,

Physiography.—PROFESSOR COOLIDGE. General physiography; physiography of the United States; topography, drainage, soil, and geological formation; effect of physiography on forest types. Lectures, recitations, field work, reports, and assigned reading. Second half, Junior year, 2 hours a week. Prerequisite, Geology 1.

State Forest Law.—PROFESSOR COOLIDGE. State Forestry and forest fire laws; history of State Forest policies; State forest reserves; forest fire associations. Lectures, assigned reading, and reports. Second half, Junior year, 2 hours a week. Prerequisites, Economics and Political Science.

Federal Forest Law.—PROFESSOR COOLIDGE. The laws relating to the Public Domain and the National Forests; study of the Use Book of the Forest Service; cases and decisions affecting the National Forests. Colorado live stock and State land law. Phases of the law pertaining generally to the lumber industry. Lectures, assigned reading, and reports. First half Senior year, 2 hours a week.

Forest Geography.—MR. TERRY. The forest regions of the United States; detailed descriptions of the more important forest types, and of commercial tree species; methods of silviculture and management; the National Forests; a few lectures on the forests of Canada, Alaska, the Hawaiian and the Philippine Islands, and Mexico. Lectures and assigned reading. First half Senior year, 4 hours a week, credit 5 hours.

Lumbering.—PROFESSOR COOLIDGE. Development, methods, and business features. The development of the lumber industry in the United States; extent and importance of the industry; the lumber industry in the important sections of the United States; costs, methods of logging and manufacture; description, and discussion of the efficiency of logging and sawmilling machinery; products; grading rules; transportation; markets; trade relations and ethics. Lectures four times a week. First half, Senior year, credit 3 hours.

Lumbering Trip.—PROFESSOR COOLIDGE. During the Fall of Senior year, students visit lumber camps, in company with the instructor, and make report on an extensive lumbering operation. In the fall of 1909 the sawmills and logging camps in the Arrow District of the Arapaho National Forest were inspected by the class. In the fall of 1910 a visit was made to the large mills within the San Juan National Forest in southern Colorado. The field trip lasts

about ten days. The report consists of a detailed description of the methods and costs of the logging and manufacturing, and a description of the lumber industry in the region visited. Credit 2 hours.

History of Forestry.—MR. TERRY. A brief discussion of the development of methods of forestry and of the organization of the National and State forest policies in Europe, India, and the United States. Lectures and assigned readings. Fernow's *History of Forestry* is used as a textbook. First half, Senior year, 2 hours a week.

Forest Management.—MR. TERRY. The methods of economic protection of forests. European and Indian methods and their conditions as compared with our own.

The economic principles underlying the management of forests with special reference to private, State, and National forest property.

The determination of the financial results of forest management. The present and future value of forest property based on productive power. The taxation of forest lands.

A critical study of working plans for forest property in Europe, India, and the United States. Methods used to secure sustained productiveness. Field methods, forest description, protection, utilization, and administration.

The policy of the National Forest Administration, its organization, the duties of its officers, practice in making the customary reports, and the preparation of timber sales, permits, accounts, records, etc. A thorough study of the Rules and Regulations governing the National Forests. Lectures and reports, first half, Senior year, 3 hours a week.

The Practice of Forestry.—MR. TERRY. After the spring vacation the work of the Seniors will be transferred to Manitou Park or to some tract of timber on the National Forests in Colorado, where field work in topographic surveying, estimating timber, forest mapping, road building, and fireline construction will be carried on. A working plan for the timber land examined will be prepared. Credit 8 hours.

Grazing.—PROFESSOR COOLIDGE. A thorough discussion will be held (a) of the live stock industry in its relation to the administration of the National Forests; and (b) of matters bearing on the conservation of the range, and the regulations for grazing on National Forests. Twenty lectures, second half, Senior year, credit 1 hour.

Roads and Trails.—MR. TERRY. Location, grades, construction and costs. Logging roads, pack trails. The cost and construction of telephone lines. Twenty lectures, second half, Senior year, credit 1 hour.

COURSES FROM OTHER DEPARTMENTS.

English—

1. *Rhetoric and Composition.*—PROFESSOR WOODBRIDGE, ASSISTANT PROFESSORS MOTTEN and NOYES, and MR. ALDEN. Elementary Course. Required of all Freshmen. Each half-year, 3 hours.
2. *Composition.*—PROFESSOR WOODBRIDGE, ASSISTANT PROFESSOR MOTTEN, and MR. ALDEN. The work will be done in connection with a study of the classical epic in translations. Lang, Leaf, and Myers' *Iliad*, Palmer's *Odyssey*, and Theodore C. Williams' *Aeneid* will be read entire. First half-year, 3 hours.
3. *Advanced Composition.* PROFESSOR WOODBRIDGE. Prerequisite, Course 2. Second half-year, 2 class exercises, credit 3 hours.

German Language and Literature—

PROFESSOR HOWE, MISS SAHM.

1. *Elementary Course.*—Grammar, Reading, Composition, Conversation. Andersen's *Marchen*; Immensee; *Germetshäusen*. Each half-year, 3 hours.
3. *Scientific German.*—Prerequisite, Course 1. For Engineering and Forestry students. Each half-year, 2 hours.

French Language and Literature—

PROFESSOR HILLS, MISS REINHARDT.

1. *Elementary Course.*—Fraser and Squair's *French Grammar*; Aldrich and Foster's *French Reader*; George Sand, *la Mare au Diable*; Labiche et Martin, *le Voyage de M.*

Perrichon. Writing from dictation, and practice in speaking. Each half-year, 3 hours.

2. *Intermediate Course*.—PROFESSOR HILLS.

(a) *Syntax and Prose Composition*. Bouvet's *French Syntax and Prose Composition*. Each half-year, 1 hour.

(b) *Modern Prose and Poetry*.—Alfred de Musset, *Pierre et Camille*; Daudet, *la Belle-Nivernaise*; Augier et Sandeau, *le Gendre de M. Poirier*; Anatole France, *le Livre de mon ami*; Balzac, *le Cure de Tours*; Bowen's *French Lyrics*. Lectures. Each half-year, 2 hours.

For outside reading: About, *le Roi des montagnes*; Balzac, *Eugenie Grandet*, *Ursule Mirouet*, *le Pere Goriot*; Coppee, *Pour la couronne*; Daudet, *le Petit Chose*, *Tartarin de Tarascon*, *Tartarin sur les Alpes*; Dumas, *les Trois mousquetaires*, *la Tulipe noire*; Erckmann-Chatrian, *le Conscrit de 1813*, *Waterloo*; Feuillet, *le Roman d'un jeune homme pauvre*; Greville, *Dosia*; Victor Hugo, *Notre Dame de Paris*; Mæterlinck, *la Vie des Abeilles*; Malot, *Sans famille*; Merimee, *Colomba*; Ohnet, *le Maître de Forge*; Saintine, *Picciola*; George Sand, *Francois le champi*, *les Maîtres sonneurs*; Souvestre, *Un philosophe sous les toits*; Verne, *le Tour du monde en 80 jours*, *Vingt mille lieues sous les mers*; Vigny, *la Canne de jonc*, *Cinq-mars*. Each student is expected to read two of these works out of class, and pass examination upon them. Other standard works, if approved by the instructor, may be read in the place of those given in the list.

Spanish Language and Literature.—

PROFESSOR HILLS, MISS REINHARDT.

1. *Elementary Course*.—Hills and Ford's *Spanish Grammar*; Hills's *Spanish Tales for Beginners*; J. Valera, *El pajar verde*; Perez Escrich, *Fortuna*. Writing from dictation, and practice in speaking. Each half-year, 3 hours.

2c. *Advanced Spanish*.—Grammar and prose composition. Ramon y Salamero, *El castellano actual*, Alarcon, *Novelas*

Cortas (Giese); Hills and Reinhardt's *Spanish Short Stories*. Each half-year, 2 hours.

Political Science—

PROFESSOR BREHAUT.

1. *General Political Science*.—A course preparatory to the study of the modern states, including the nature of the state, the structure and the province of government. First half-year, 3 hours. Given in 1911-'12, and in alternate years.
2. *American Government and Politics*.—The historical foundations; the present-day organization and working of national, state, and local government. This course or Economics 1 required of all Juniors. Second half-year, 3 hours. Given in 1911-'12, and in alternate years.

Economics—

PROFESSOR BUSHEE.

1. *Principles of Economics*.—This course or Political Science 2 required of all Juniors. A general survey based upon the study and discussion of a text-book giving the currently accepted scientific analysis of industrial society, supplemented by lectures and assigned readings. The purpose of the course is to teach fundamental principles, to open the field of Economics in the way most helpful to further more detailed study of special problems, and to give to those who intend to adopt business, law, or journalism, the general rules and principles contributed to business by the science of economics. First half-year, 3 hours.
20. *Business Organization*.—A practical study of the methods used in the production and distribution of wealth, including the organization of agricultural and manufacturing industries, transportation, the world's commerce, stock and produce exchanges, advertising, wholesale and retail dealings, etc. Designed for second-year students as a preparation for economic theory. Second half-year, 2 hours. Given in 1911-'12 and alternate years.
- 12.* *Transportation Problems*.—The industrial significance of modern transportation; the development of railway transportation in Europe and in this country; a study of the

*Prerequisites, Economics 1.

railway problems of the United States; methods of government control of railways; problems of water transportation. Second half-year, 2 hours. Given in 1910-'11 and alternate years.

Law—

MR. HALL, MR. HURLEY, MR. BIRCHBY, MR. ARNOLD.

—The courses in Law have been arranged with a view to meeting the wants of students who, not intending to practice law, nevertheless desire a thorough foundation in the general principles on which Anglo-Saxon jurisprudence is based, as well as of those who intend to complete their studies and practice the profession. The principal law schools of the country grant credit for work done in these courses.

1. *Elementary Law*.—The elementary principles and doctrines of the law exhibiting them in their logical and practical connections with each other. The student is thus acquainted with the general nature and scope of the law as a science, which those who further pursue their legal studies are to master in detail. Text-book and lectures. Smith's *Elementary Law*. First half-year, 3 hours.

Mathematics—

PROFESSOR CAJORI, ASSISTANT PROFESSOR ALBRIGHT.

1. *Algebra*.—Graphs; Variation; the Binomial Theorem; Logarithms; Undetermined Coefficients; Permutations and Combinations; Series; Theory of Equations. First half-year, 3 hours.
2. *Solid and Spherical Geometry*.—ASSISTANT PROFESSOR ALBRIGHT. Planes and Lines in Space; Polyhedra, the Cylinder, Cone and Sphere; Spherical Triangles. Second half-year, 2 hours.
3. *Plane Trigonometry*.—The functions of one and two angles; the solution of triangles; De Moivre's theorem; simple applications. Second half-year, 3 hours.

Chemistry—

PROFESSOR STRIEBY.

1. *Elementary Chemistry*.—Text-book work (chiefly Inorganic Chemistry) supplemented by lectures and discussions upon the fundamental laws, the application of chem-



LOGGING: SAN JUAN NATIONAL FOREST



SAWMILLING: SAN JUAN NATIONAL FOREST

istry to sanitary science, medicine, and some of the arts, and also by occasional papers from descriptions in technical books, and by reports of visits to metallurgical and manufacturing establishments. Remsen's *College Chemistry*. Each half-year, 3 hours' recitation and 4 hours' laboratory work, credit 3 hours.

2. *Advanced Chemistry*.—This course gives a general knowledge of chemistry. The second term is devoted mainly to Organic Chemistry. The chief theories and laws are studied with reference to the explanation of chemical phenomena. The practical application of chemistry in the arts, and its uses in the sanitary regulations of daily life and work, are brought prominently forward. Abstracts from books on chemical technology and sanitary science, and discussions upon recent discoveries and applications of chemistry, will occasionally take the place of the usual recitation. The work in the laboratory comprises short courses in Qualitative and Quantitative Analysis and the preparation of inorganic and organic compounds. Each half-year, 3 hours' recitation or lectures and 4 hours' laboratory work, credit 3 hours.

The fee for every course must be paid in advance. It covers the cost of gas, chemicals, and non-returnable supplies, except platinum. Glassware and necessary apparatus (except platinum vessels) are loaned to the student and must be returned in good condition. The fees are as follows:

Course 1	\$7.00
Course 2	8.00

Biology—

PROFESSOR SCHNEIDER, MISS GILBERT, MISS STRIEBY.

- I. *General Biology*.—A general outline of the fundamental principles of Biology. Methods of investigation, origin of living matter, organization, growth and reproduction, differentiations, heredity, evolution.

(a) First half-year: *Plant Studies*.—In the laboratory a comparative study is made of the cryptogams, beginning with the simplest forms. This is followed by a study of the structure of typical flowering plants.

(b) Second half-year: *Animal Studies*.—The laboratory work involves a study of representatives of the principal groups of animals.

Recitations or lectures, 2 hours; laboratory work, 4 hours; credit 3 hours.

2. *Plant Physiology*.—Prerequisites, Biology 1, and one year of Chemistry. A study of the functions of the organs of seed plants. Emphasis is placed upon composition and nutrition of plants, and the vegetable enzymes. First half-year, 3 hours. Given in 1911-'12 and alternate years.
3. *Botany of the Seed Plants*.—PROFESSOR SCHNEIDER, MISS GILBERT. Prerequisite, Botany 1. Adaptations, migration, distribution, and successions are considered at length. Opportunity is also given the student to become proficient in the determination of plant species among gymnosperms and angiosperms. Field excursions for the purpose of studying the local plant geography. Second half-year, recitations or lectures, 2 hours; field or laboratory work, 4 hours, credit 3 hours.
4. *Plant Histology*.—MISS GILBERT. Prerequisite, Biology 1. This course, in addition to a study of plant structure, affords experience in the technic of microscopical preparations. The paraffin method, the celloidin method, the glycerine method, and free-hand sectioning are applied. First half-year, credit 2 or 3 hours (3 hours in the laboratory counting as 1 hour).
- 7a. *Physiology and Personal Hygiene*.—Prerequisite, Biology 1. Lectures, recitations, and practical work by the student. The experimental work covers the following subjects: The physiology of ciliary motion; the general physiology of muscle and nerve tissue; phenomena of circulation, with countings of the blood-corpuscles and estimation of hæmoglobin; respiratory exchanges, movements, etc.; digestion and absorption; physiology of the spinal cord and brain; of the cutaneous sensations, taste, smell, hearing, and vision. Some time is also given to lectures, with demonstrations, on the physiological action of the more important poisons. Each half-year, recitations or lectures, 3 hours; laboratory work, 2 hours, credit 3 hours.

Physics—

PROFESSOR MILLS.

1. *Elementary Physics*.—An introductory course in general physics for students who enter without high school physics. Text-book work, class work, and demonstration lectures. Text: Millikan and Gale's "*First Course in Physics*." First half-year, 3 hours.
2. *General Physics*.—*Mechanics, molecular physics, and heat*. Lectures, class and problem work, and either one or two laboratory periods of three hours. Text: Millikan's "*Mechanics, Molecular Physics, and Heat*." Prerequisite, trigonometry, Math. 3. Not open to Freshmen. First half-year, either 5 or 6 hours.

Geology.—

1. *General Geology*.—Prerequisite, Elementary Chemistry. Dynamical, Structural, and Historical Geology. Lectures; laboratory work Tuesday and Thursday afternoons, and field excursions on Saturday mornings. The student, while not required to do so, is advised to elect Mineralogy (Geology 2) and Zoology (Biology 1b) before taking Geology 1, or at the same time with it. Text, Chamberlin and Salisbury's *Geology*. Each half-year, 3 hours.
2. *Mineralogy*.—Prerequisite, Elementary Chemistry. Required for Courses 4 and 6. The economic or ore classification of minerals is used and the time is devoted chiefly to laboratory work in Descriptive and Determinative Mineralogy. Text, Moses and Parsons's *Mineralogy, Crystallography and Blowpipe Analysis*. Laboratory fee, \$3.00. Uniform individual working outfits are furnished at cost. Each half-year, 6 hours, credit 3 hours.
3. *Economic Geology*.—Prerequisite, Courses 1 and 2. Lectures and required reading. The geology and mineralogy of the ore deposits of the United States (gold, silver, copper, lead, zinc, iron). The greater part of the second half-year is devoted to the consideration of coal, building stones, and the less important non-metallic minerals. In the spring there are voluntary field excursions to mining localities. Texts: Kemp's *Ore Deposits of the United States and Canada*, Kemp's *Economic Geology of the Non-metallic Minerals*. Each half-year, 3 hours.

Civil and Irrigation Engineering—

MR. MARTIN, MR. ALBRIGHT.

1. *Theory and Practice of Surveying*.—Construction, use and adjustment of instruments; pacing, use of chain, compass, level and transit; contouring and leveling by hand; cross-sections; theory of stadia measurement; azimuth traverse; balancing survey; mapping. Field problems are assigned on the basis of the students' field experience and future needs. Second half, Freshman year, 2 hours. *Required of Civil, Irrigation, and Mining Engineers, and Foresters.*
5. *Advanced Surveying*.—Continuation of Course 1. Topographic surveying; hydrographic surveying; city surveying; geodetic surveying; mineral land and mine surveying; elementary railway curves, frogs, and switches. Recitations, lectures, and assigned reading. The field work problems are assigned on the basis of the student's previous field experience. The following surveys and maps are required: Transit and stadia topography; plane table topography; repetition traverse, reservoir site; street grades; city subdivision; hydrographic survey; triangulation survey. The field work in mine surveying is executed under the direction of the Mining Department. Students seeking advanced credit in surveying must present note-book covering the work for which credit is sought. First half, Junior year, 2 hours. *Required of Civil and Mining Engineers and Foresters.*
51. *Irrigation Engineering*.—MR. MARTIN. Irrigation of land; amounts and periods of application; grades, cross-section, and capacity of canals; surveys for irrigation works; source of water supply; hydrographic data; Colorado streams; return of seepage waters; irrigation by pumping. Lectures, recitations, and assigned reading. Second half, 3 hours.
61. *Water Supply*.—Rainfall and storage; flow of streams; influence of soils, elevation and geologic characteristics of water-shed; methods of supply; underground flow; reservoir construction; distributing systems; house-supply and wastage. Recitations, collateral reading, and design work. First half, Senior year, 3 hours.

Field Courses in Surveying at Manitou Park During June and July.

MR. MARTIN AND ASSISTANTS.

201. *Field Practice in Plane Surveying*.—Prerequisite, Civil 1. Four weeks in Manitou Park, between the Freshman and the Sophomore years. Credit 4 hours. *Required of Civil, Irrigation, and Mining Engineers, and Foresters.*
241. *Field Practice in Hydrographic Surveying*.—Two weeks in Manitou Park, between the Junior and the Senior years. Credit 2 hours. *Required of Civil Engineers and Foresters.*

Graphics—

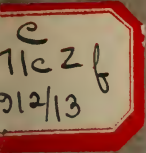
ASSISTANT PROFESSOR MOORE. Students are expected to devote more time to drawing than the number of hours assigned in the statements given below, but may do the extra work at such hours as suit their convenience.

Students are expected to provide themselves with a good and complete set of drawing instruments—design and make to be approved by the instructor.

1. *Elements of Drawing*.—This course includes elementary exercises to develop facility in the use of the instruments, selected geometrical problems, cross-sections, shading with the right line and the bow pen, conventional representations, mathematical curves, cycloidal, and other motion curves, isometric, oblique and orthographic projections, working drawings, tracings, the form and proportions of standard letters, both freehand and ruled, methods of spacing and laying out titles. First half, Freshman year, 2 hours, credit 1 hour.

Students, 1910-1911

Appel, Robert Godfrey	San Francisco, Cal.
Baker, Frederick Storrs	Beverly, Mass.
Benjamin, Willis	Longmont, Colo.
Boynton, Ralph Henry	Los Angeles, Cal.
Colwell, Raymond Gardner	Colorado Springs.
Cooke, Harold Percy	Cheyenne, Wyo.
Copeland, George Holliday	Greeley, Colo.
Cowdery, George Sabin, Jr.	Denver, Colo.
Dennis, George Wesley	Loveland, Colo.
Donovan, Andrew William	San Francisco, Cal.
Floyd, Joseph Ellenwood	Manchester, Mass.
Gardner, George Lewis	Fort Collins, Colo.
Harder, William Frederic	Chicago, Ill.
Hill, Fred Craig	Colorado Springs.
Howes, Harry Patterson	Topeka, Kas.
Lake, Sebastian Greenway	Clinton, Ia.
Lindstrom, Ernest Walter	Chicago, Ill.
Miller, Raymond Edward	Hillsboro, Ohio.
Moye, Ralph Albert	Colorado Springs.
Park, Nelson Renfrew	Longmont, Colo.
Parker, Jean Lucian	Greenfield, Mass.
Peirce, Chandler Darlington	Denver, Colo.
Reed, Glenn George	Glenwood, Minn.
Rice, Frederic Henry	Colorado Springs.
Sanderson, Walter Whitney	Deerfield, Mass.
Sherry, Arthur Cotton	Denver, Colo.
Sloey, Lance Claude	Colorado Springs.
Smiley, David Robinson	Manitou, Colo.
Steuart, Charles	Colorado Springs.
Tanner, Richard	Erie, Pa.
Taplin, Warren Hartt	Honolulu, Hawaii.
Tear, Alton Edward	Painesville, Ohio.
Thompson, Fayette Lathrop, Jr.	New York City.
Vandemoer, Herbert Robinson	Denver, Colo.
Williams, Chalmer Marion	Bushnell, Ill.
Waalén, Carl August	Glenwood, Minn.



THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

COLORADO COLLEGE PUBLICATION

GENERAL SERIES No. 62.

BULLETIN SERIES No. 41

ANNOUNCEMENT Department of Forestry

RECEIVED
MAY 1912

COLORADO SPRINGS, COLORADO
MAY, 1912

Published by authority of the Board of Trustees of Colorado College every six weeks during the Academic year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado, under Act of Congress of July 16, 1904.

COLORADO COLLEGE PUBLICATION

GENERAL SERIES No. 62.

BULLETIN SERIES No. 41

ANNOUNCEMENT Department of Forestry

COLORADO SPRINGS, COLORADO
MAY, 1912

Published by authority of the Board of Trustees of Colorado College every six weeks during the
Academic year.

Entered as second-class matter, September 23, 1905, at the Post Office at Colorado Springs, Colorado, under
Act of Congress of July 16, 1904.

CALENDAR

Ranger Course.

1912.

Sept. 10—Registration at Manitou Park.....Tuesday
Sept. 11—Instruction begins at Manitou Park.....Wednesday
Nov. 27—Thanksgiving Recess begins.....Wednesday
Dec. 2—Instruction begins at Palmer Hall, Colorado Springs,

8:15 A. M.....Monday

Dec. 20—Christmas Recess begins 5 P. M.....Friday

1913.

Jan. 7—Christmas Recess ends at 8:15 A. M.....Tuesday

Feb. 22—Washington's Birthday: a holiday.....Saturday

Mar. 17—Examinations begin, Winter term.....Monday

Mar. 20—Spring Recess begins at 5 P. M.....Thursday

Apr. 1—Spring Recess ends, Instruction begins at Manitou

Park Tuesday

May 30—Memorial Day: a holiday.....Friday

June 28—Spring Term at Manitou Park ends.....Saturday

Technical Course.

1912.

Sept. 10—Registration at Manitou Park.....Tuesday

Sept. 11—Instruction begins at Manitou Park.....Wednesday

Sept. 21—Condition Examinations begin.....Saturday

Nov. 27—Thanksgiving Recess begins.....Wednesday

Dec. 2—Instruction begins at Palmer Hall, Colorado Springs..Monday

Dec. 20—Christmas Recess begins at 5 P. M.....Friday

1913.

Jan. 7—Christmas Recess ends at 8:15 A. M.....Tuesday

Jan. 17—Mid-year Examinations begin, Juniors.....Friday

Jan. 27—Second Half Year begins at 8:15 A. M., Juniors.....Monday

Feb. 22—Washington's Birthday: a holiday.....Saturday

Mar. 3—Mid-year Examinations begin, Seniors.....Monday

Mar. 8—Condition Examinations begin.....Saturday

Mar. 14—Second Half Year begins, Seniors.....Friday

Mar. 20—Spring Recess begins at 5 P. M.....Thursday

Apr. 1—Spring Recess ends, Instruction begins at Manitou

Park Tuesday

May 29—Spring Term in Field ends, Seniors.....Thursday

May 30—Memorial Day: a holiday.....Friday

June 8—Baccalaureate Sermon.....Sunday

June 9—Class Day.....Monday

June 11—Commencement.....Wednesday

June 28—Spring Term at Manitou Park ends, Juniors.....Saturday

FACULTY

WILLIAM FREDERICK SLOCUM, D. D., LL. D.
President.

WILLIAM CODMAN STURGIS, PH. D.
Dean and Lecturer on Vegetable Pathology.

PHILIP TRIPP COOLIDGE, M. F.
Director and Professor of Forestry.

ELWOOD IDELL TERRY, S. B.
Instructor in Forestry.

EDWARD CHRISTIAN SCHNEIDER, PH. D.
Head Professor of Biology.

FLORIAN CAJORI, PH. D.
Head Professor of Mathematics.

FREDERICK ALEXANDER BUSHEE, PH. D.
Professor of Political Economy.

GEORGE IRVING FINLAY, PH. D.
Head Professor of Geology.

ELIJAH CLARENCE HILLS, PH. D., LITT. D.
Head Professor of Romance Languages and Literatures.

GEORGE MAXWELL HOWE, PH. D.
Professor of German.

THOMAS LANSING PORTER, PH. D.
Instructor in Physics.

WILLIAM STRIEBY, A. M., E. M.
Head Professor of Chemistry.

HOMER EDWARDS WOODBRIDGE, A. M.
Professor of English.

HOWARD MOORE, C. E.
Assistant Professor of Graphics.

GEORGE EARL MARTIN, B. S.
Assistant Professor in Civil Engineering.

BENJAMIN MATHER WOODBRIDGE,
Instructor in French and Spanish.

SPECIAL LECTURERS FROM THE U. S. FOREST SERVICE.

MR. JAMES T. JARDINE, *Inspector of Grazing.*—Grazing and Range Problems.

MR. FRED. W. MORRELL, *Chief of Operation, District 2.*—Fire Protection and Permanent Improvements on the National Forests.

MR. CARLOS G. BATES, *Office of Silvics.*—Management of Rocky Mountain Species.

MR. R. D. WYATT, *Office of Law.*—Public Land Laws.

MR. W. I. HUTCHINSON, *Technical Forester, Pike National Forest.*—Planting and Sowing.

DEPARTMENT OF FORESTRY

Forestry as a Profession

The increasing demand for the practice of Forestry throughout the United States on both public and private lands is the result of the rapid depletion of our forests. Changes in methods of lumbering, better forest fire protection, and the reforestation of denuded areas are urgently needed, if there is to be a timber supply in the future, and if the sources of the waters now used for domestic purposes, power and irrigation are to be protected.

No profession offers greater opportunities for individual success through public service than Forestry. Yet success in this work can be won only by conscientious and unstinted devotion. The discomforts due to weather or isolation in the field, test unfailingly the forester's capacity for success.

Forestry should not be selected as a profession except by those with enthusiasm for the work and with sound health. No man can expect to prepare himself for Forestry unless he is ready for the hard study which masters detail and for the rough life of the woods. A thoroughly trained forester must have complete detailed knowledge of his subject and abundant drill in its methods.

Organization of the Department

The Department of Forestry was established in 1905. The foundation was laid through the generosity of General W. J. Palmer and Dr. W. A. Bell, who presented the College a tract of 9,500 acres of timber land known as Manitou Park. Of this, 3,200 acres of agricultural land have been sold, the proceeds being applied toward an endowment for the Department. The remainder of the tract, which is timbered, is used for field instruction.

Catalogues may be obtained from the Secretary of Colo-

rado College. For additional information application should be made to The Director, Department of Forestry, Colorado College, Colorado Springs, Colorado.

Advantages and Equipment

The Department of Forestry is unusually well prepared to fit men for administrative work on the National Forests. The location of Colorado College makes it possible to give its students first-hand instruction in the administrative work on the National Forests, such as timber cruising, timber sales, planting and nursery work, grazing, special uses, etc. Furthermore, the Department has the double advantage of giving Western young men opportunity to study at home and of giving Eastern young men who wish to secure positions on the National Forests of the West opportunity to become familiar with Western habits of thought and life during their college years. The Department is excellently prepared to give the necessary instruction as to the administrative relations of the Forest Service to the grazing business, the mining business, and other enterprises characteristic of the West. Its location near the National Forests makes it possible to secure the frequent aid of Forest Service officers for lectures or instruction.

Besides the advantages afforded by the location and the ideal climate of Colorado Springs, the students have the advantages of Colorado College Scholarships, the College Library, the large and well-equipped laboratories of the Departments of Biology, Geology, Physics, Chemistry, and Engineering, the Museum, the Literary Societies, the College Lecture Course, and the use of Dormitories and Boarding Clubs. For further information on any of these points, see the catalogue of Colorado College or address the Director of the Department of Forestry.

The largest forest nursery maintained by the Forest Service in the Rocky Mountain States is at Monument, within a half hour's ride by railroad; and the Fremont Experiment

Station of the Forest Service near Manitou is within walking distance of the street car line.

Space in a greenhouse owned by a large floral company in Colorado Springs has been obtained for experimentation in the germination of forest tree seeds.

A Foresters' Club meets fortnightly to consider current events in forestry and to discuss papers of professional interest.

THE WOOD TESTING LABORATORY.

A room in the Mechanical Laboratories building has been assigned for the testing of materials of construction. Here are mounted a 100,000-pound Riehle testing machine for making tension, compression, shearing and transverse tests, and an abrasion cylinder for testing paving material; both machines are driven by a five-horsepower Crocker-Wheeler motor. In addition to other accessory apparatus, a Henning entensometer is available for tension tests and an Olsen compression micrometer for compression tests, each instrument reading to one ten-thousandth of an inch. Students are required to make a series of tests upon the resisting properties of various species of commercially important woods. Tests made from time to time for local manufacturers and others, bring the students into close touch with practical work of this sort.

MANITOU PARK—THE FIELD LABORATORY.

Manitou Park is a tract of 6,000 acres situated twenty-seven miles from Colorado Springs and eighteen miles north of Pike's Peak, at an altitude of about 7,500 feet. It is reached by the Colorado Midland Railroad to Woodland Park, twenty miles, and then by stage, seven miles. It is within the boundaries of the Pike National Forest. Camp Colorado, a group of cottages used in conjunction with the Department of Engineering, makes a most convenient and homelike center for the field courses.

The Park is under the direct supervision of the Department of Forestry. It affords unusual opportunities for study and practical experience in the field. It has a good stand of Western

Yellow Pine and Douglas Fir. Much of the timber is mature, and logging and milling operations are now being carried on. An abundant young growth is replacing the timber that is being removed. The rich land along a stream which waters the valley offers an excellent opportunity for the establishment of nurseries and the study of tree planting. The forest is being brought into the best possible producing condition. The students are given opportunity, under the direction of the Forestry Faculty, to take part in all the phases of the treatment and management of the forest. The class of 1910, as instruction in the Practice of Forestry (p. 20), prepared a detailed working plan for the timber land. This plan is being executed and revised by subsequent classes.

The College has a good working equipment of axes, saws, calipers, surveying instruments, meteorological instruments, and such other apparatus as is needed in the study and care of the forest.

Duration and Arrangement of Courses

THE RANGER COURSE

Object.

The chief demand in Forestry is for men who are able to manage forest lands in practical ways. The Forest Service requires well trained men for the administration of the National Forests. The One Year Ranger Course offered by the Department of Forestry of Colorado College is intended for rangers, guards and others employed in forest work who desire to increase their efficiency, and for those who wish to prepare for such work.

The instruction for rangers offered by Colorado College has been the most highly appreciated field of work in the Department of Forestry. The attendance by National Forest rangers has been large each year. The Ranger Course offers the best of preparation for those who wish to advance in administrative forest work.



THE RANGER SCHOOL, 1911-1912



STUDENTS MAKING TOPOGRAPHIC AND FOREST MAP

Admission and Expenses.

The Ranger Course is open for admission to (1) Graduates of High Schools, or to students who have had equivalent preparation; (2) Men under Forest Service appointment; (3) Others, not less than eighteen years of age, at the discretion of the Director.

The expenses for the course are about as follows:

Tuition	\$50.00
Books, stationery, etc., about	10.00
Board and lodging in Colorado Springs, per week	\$5.00 to \$7.00
Board at Manitou Park, per week	\$4.00 to \$5.00

At Manitou Park the students room and board in cottages. Students are required to furnish their own blankets, bed linen and towels. There is no charge for lodging; board, which is on the co-operative plan, does not exceed \$4 or \$5 per week. The total expenses for the course, after arrival at Manitou Park, are about \$300.00.

COURSE OF STUDY.

September 11 - December 1.—Demonstrations and Field Practice, Manitou Park.

- Seed Collection, one week.
- Surveying, three weeks.
- Mensuration, three weeks.
- Silviculture: Marking timber, silvical studies, etc., two or three weeks.
- Lumbering, Field studies, one or two weeks.
- Miscellaneous: Packing, construction of trails, cabins, etc., fire protection.

December 1 - March 20—Colorado Springs. Lectures and Laboratory Work.

- Botany, Silviculture, Dendrology, Meteorology, Diseases of Trees, Entomology, Identification of Common Woods, Forest History, First Aid to the Injured, Care of Horses, Grazing, Public Land Laws, Forest Administration, Forest Regions, Geology and Soils, Lumbering, Fish Culture and Game Protection.

April 1-June 28.—Manitou Park.

Advanced Surveying, Topographic and Forest Mapping.

Timber Estimating, Study of Range Plants, Forest Planting and Sowing, Range Reseeding, Stream Gauging.

Description of Courses

PROFESSOR COOLIDGE AND MR. TERRY.

English. Grammar, rhetoric, and composition.. Theme writing. The use of correct English in reports and examinations is required.

Botany. Parts of a plant, methods of classification and identification, physiology, study of tissues. Lectures and laboratory practice.

Mechanical Drawing. Use of instruments. Map drawing, lettering.

Geology. Important rocks and minerals. Geologic processes such as erosion, vulcanism, etc. Relation of geology to forest growth. Lectures.

Meteorology. Brief discussion of climatic phenomena. Weather observations. Lectures and demonstrations with instruments by recorder of Colorado Springs Weather Bureau Station.

Silviculture. The life history of a forest tree. Forest types. Relations of trees to environment. Injuries to trees. Relations of forests to climate and stream flow. The improvement of the forest through use and proper treatment. Reproduction of stands, methods of thinning. Inspection of the work at Fremont Experiment Station at Manitou. The management of Western species, their requirements, distribution, uses. Methods of cutting in Western forest types. A study of past cutting at Manitou Park. Practice in marking stands for cutting. Reports, lectures, recitations and field practice. Essentially the same instruction is given in the Ranger course as in the two-year Technical

course. Text book, Graves' *Principles of Handling Woodlands*.

Seed Collection. Gathering and extraction of seed. Winter storage. Lectures and field practice.

Forest Planting and Sowing. Nursery practice. Study of the germination of seed of forest trees and of the development of seedlings. Methods of sowing and planting. An inspection of the Monument Nursery of the Forest Service is made. Lectures and field practice.

Dendrology. Identification and characteristics of Western trees. Field practice, lectures, demonstrations and recitations.

Diseases of Trees. Characteristic actions of fungi. The life habits of a few important fungi. The decay of timber. Methods of preservative treatment. Lectures and laboratory practice.

Forest Entomology. Life habits of insects destructive to Western trees. Methods of combating insects. Lectures and field practice.

Forest Management. A few lectures on the theory of regulating the yield and determining the future value of a forest. Practical methods of administration of American forest tracts.

Wood Technology. A few lectures on the structure and properties of wood. Identification in the laboratory of a few important Western and commercial varieties.

Soils. A brief discussion of the properties and classification of soils. Laboratory and field practice.

Forest Regions. A few lectures on the forest regions and important commercial trees of the United States.

History of Forestry. Brief review of Forestry in Europe and other countries. Bearing of forest policy abroad on American problems. Lectures.

Forest Law. The public land laws and the laws and regulations relating to the National Forests. A complete study of the National Forest manual is made. Laws of the Western States relating to Forestry and to forest fires. Law of contracts and other business law of importance in the lumber business. Lectures and recitations.

Surveying. Use of instruments. Note keeping. Measurements of stream flow. Field exercises.

Advanced Surveying. Use of traverse and plane table. Topographic mapping. Forest mapping and estimating. A map estimate and plan of operation for a large tract of forest is prepared.

Mensuration. Log scales. Cordwood measure. Construction of volume, height, growth and yield tables. Practice in scaling. Methods of estimating stands. Essentially the same instruction is given in the Ranger course as in the two-year Technical course. Field exercises. Text book, Graves' *Forest Mensuration*.

Lumbering. Methods of logging and milling. Costs of operations, methods of accounting and cost keeping. Lectures and investigations of a typical operation. Determination of stumpage values. Students may be required to take part for a short period in the work of a logging and saw-milling operation.

Fire Protection. Lectures and field practice. Fire lines, lookout stations, patrol, tools, methods of fighting fire. Preparation of plans for fire protection of forest tracts. Study of damage by fire to standing timber and reproduction.

Instruction in Camping and Packing. Camp cooking, hygiene, packing, shooting, etc.

Construction of Cabins, Roads, Telephone Lines, Etc. A practical discussion of methods and costs, supplemented by field practice.

First Aid to the Injured. A few lectures and demonstrations by a local physician.

Care of Horses. A few lectures and demonstrations by a veterinary surgeon. Horse-shoeing. Defects and ailments of horses.

Grazing. A thorough discussion of range and live stock problems. Methods of handling stock. The stock laws of the Western States. Federal inspection. Range plants—their value and identification. Range reseeding. Lectures and field practice.

Fish Culture and Game Protection. The care and propagation of fish and game. Fish and game laws.

THE TECHNICAL COURSE

Object.

The aim of the course is to give to students who intend to adopt Forestry as a profession a thorough training which will fit them for positions in the Government Forest Service, or as State Foresters, teachers of Forestry, or expert foresters in private employ.

Admission, Expenses, Etc.

Students who have completed two years of College work in which the following courses have been included, will be admitted to instruction in the Department of Forestry as candidates for the degree of Forest Engineer:

Biology, two years, of which one and one-half years must be Botany.

Geology, one year.

Trigonometry.

Political Science and Economics, one year.

English, one year.

German, two years.

Physics, one year.

Chemistry, one year.

Mechanical Drawing, one-half year.

Surveying, equivalent to courses 1, 201, 211, and 5 in Colorado College.

The two-year course in the Department of Forestry is conducted at Manitou Park from the beginning of the College year until November 27, in Colorado Springs from December 1 until the Spring vacation, and at Manitou Park until July 1. In Senior year the work following the April vacation may be conducted elsewhere than Manitou Park and will end about June 1. Students will be expected to go to Manitou Park at any time during the college year to assist in practical work on the College Forest.

Although only one course in English is ordinarily required in preparation for the two year course, it is expected that students will be able to write correct and concise English in their technical work, and, at the discretion of the Director, students who are deficient in capacity for expression in good English will be required to take additional courses. Modern Language other than German may be accepted for entrance to the Department if the equivalent of the required German is included in the student's College entrance credits.

Courses must be taken in the sequence arranged in the catalogue, and failure to pass prerequisite courses will bar students from advanced courses. The presentation of a thesis is recommended.

Students who successfully complete the full course will be awarded the degree of Forest Engineer.

It is recommended that students who are planning to work their way, in large part, through the Department of Forestry, take five years for their undergraduate course.

EXPENSES.

Tuition:

Regular Course, for full year (ten months)	\$60.00
Matriculation	5.00
Graduation	5.00

Annual Fees:

Library fee	\$3.00
Athletic fee	4.00

Railway and stage fares to and from Manitou Park or to points on the National Forests amount to \$10 or \$15 a year.

Tuition bills are payable to the Treasurer of Colorado College. Students who are registered in departments of Colorado College other than the Department of Forestry and who take courses in Forestry will be charged fees at the discretion of the Director.

Board:

In young men's clubs, a week	\$3.50 to \$5.00
In the City, a week	4.00 to 8.00
At Manitou Park, board, a week	4.00 to 4.50

Furnished Rooms:

In College Dormitory,* by the year	\$40.00 to \$80.00
In the City, by the month	from \$7.00 up
No charge for lodging at Manitou Park.	

Text Books:

Of the more important books which treat of technical forestry, duplicates for the use of students will be found in the library. The following standard books must be purchased by each student:

- Forest Mensuration.—*Graves.*
- History of Forestry.—*Fernow.*

*Students furnish towels and bed linen.

Manual of the Trees of North America.—*Sargent*.
Principles of Handling Woodlands.—*Graves*.

It is also advised that students secure Fernow's Economics of Forestry, and Schlich's Manual of Forestry (Vols. II. and III.).

Program of Technical Courses

JUNIOR YEAR.

<i>First Half-Year.</i>	<i>Hours per Week.</i>	<i>Second Half-Year.</i>	<i>Hours per Week.</i>
Dendrology	5	Dendrology	5
Wood Technology	6	Silviculture	2
Silviculture	5	Forest Extension	3
Field Work in Silviculture 2 wks.		Forest Protection	3
Forest Mensuration 4 wks.		Minor Forest Products	2
		State Forest Law	2
		Physiography, prescribed reading.	
		Meteorology, prescribed reading.	

SENIOR YEAR.

The first half of Senior year ends March 1.

<i>First Half-Year.</i>	<i>Hours per Week.</i>	<i>Second Half-Year.</i>
Forest Geography	3	Grazing, twenty lectures.
Federal Forest Law	3	Roads and Trails, twenty lectures.
Forest Management	3	The Practice of Forestry, field work.
Lumbering	4	
Lumbering Trip.		
History of Forestry	2	

Description of Courses

Dendrology.—MR. TERRY. The characteristics of the important timber trees of the United States in both their winter and summer conditions. A bud key will be prepared by each student for identification of trees in winter condition. Text, *Sargent's Manual of the Trees of North America*. The Silvical and Planting Leaflets of the Forest Service will be used for collateral studies. Lectures, field work, and assigned readings. Junior year, 5 hours a week throughout the year.

Silviculture.—MR. TERRY. The life histories of trees and the relations of trees to their environment. Special reference is made to the influence of temperature, light, moisture, and soils on tree growth.



STUDENTS ESTIMATING TIMBER



STUDENTS BURNING BRUSH

The relations of trees to each other in the forest. Injuries to forests and forest trees.

The improvement of the forest through use and proper treatment. The reproduction of trees, the form and growth of stands, methods of thinning for improving and reproduction; silviculture systems of management. The students have the opportunity of becoming familiar with the experiments in silviculture conducted by the Forest Service at its Experiment Station near Manitou. Junior year, lectures or recitations, with field work additional, throughout the year; assigned reading and reports.

Field Work in Silviculture.—MR. TERRY. A critical study of the work done in the forest at Manitou Park. Exercises in marking trees for improvement and reproduction cuttings. A general study of the silviculture work done on the Pike National Forest will be made. The inspection work will be written up in reports. Two weeks at Manitou Park in the fall of Junior year.

Forest Extension.—PROFESSOR COOLIDGE. The establishment of forests through artificial regeneration. Methods in nursery work, in direct seeding, in planting, and in the care of plantations are considered. Each student is required to prepare a planting plan for a portion of Manitou Park. Experimental study of the germination and development of seeds of various tree species. Inspection of the Forest Service Nursery at Monument, Colo. (Monument is a half-hour's railroad ride from Colorado Springs). Lectures, assigned reading, field work, and reports. Second half, Junior year, lectures or recitations, 3 hours a week, with field work additional.

Forest Mensuration.—MR. TERRY. The use and construction of log rules; the determination of the contents of logs in board, standard, volumetric, and cord measure; the contents of standing trees; the increment in diameter, height and volume of single trees and whole stands. The construction and use of volume and yield tables; the determination of the age of single trees and stands. Methods of timber estimating, and application to extensive tracts. Lectures and field work. Text, *Graves' Forest Mensuration*. 4 weeks at Manitou Park, in the fall of Junior year.

Wood Technology.—PROFESSOR COOLIDGE and ASSISTANT PROFESSOR MARTIN. The structural, mechanical, physical, and chemical properties of wood, including timber-testing on Olsen and Riehle

machines. The identification of the more important commercial woods. First half, Junior year, lectures 2 hours, laboratory work 4 hours a week.

Minor Forest Products.—PROFESSOR COOLIDGE. The methods of harvesting and manufacturing forest products exclusive of lumber. Special attention will be given to the wood pulp, naval stores, tanning, charcoal, maple sugar, wood alcohol and wood vinegar industries, and to methods of wood preservation. Lectures, second half, Junior year, 2 hours a week.

Forest Protection—

Diseases of Trees.—DR. STURGIS and PROFESSOR COOLIDGE. Lectures and laboratory work on fungi injurious to trees and to timber. The causes, effects, and treatment of wounds. The course includes a consideration of normal and pathological vegetable physiology. Assigned reading, lectures, and examinations. Second half, Junior year, 2 hours a week.

Forest Entomology.—MR. TERRY. A study of the life histories and habits of injurious insects, with special reference to insects that attack trees and forest products. Methods of identification and methods of combating. Natural enemies. Students are required to make a collection of representative species of insects properly named and labeled. Lectures. Second half, Junior year, 2 hours a week.

Meteorology.—MR. TERRY. Text book, Davis's *Elementary Meteorology*. Prescribed reading and examination.

Physiography.—PROFESSOR COOLIDGE. Physiography of the United States; soils. Assigned reading and examination.

State Forest Law.—PROFESSOR COOLIDGE. State Forestry and forest fire laws; history of State Forest policies; State forest reserves; forest fire associations. Lectures, assigned reading, and reports. Second half, Junior year, 2 hours a week.

Federal Forest Law.—PROFESSOR COOLIDGE. The laws relating to Public Domain and the National Forests; study of the Use Book of the Forest Service; cases and decisions affecting the National Forests. Phases of the law pertaining generally to the lumber industry. Lectures, assigned reading, and reports. First half, Senior year, 2 hours a week.

Forest Geography.—MR. TERRY. The forest regions of the United States; detailed descriptions of the more important forest types,

and of commercial tree species; methods of silviculture and management; the National Forests; a few lectures on the forests of Canada, Alaska, the Hawaiian and the Philippine Islands, and Mexico. Lectures and assigned reading. First half, Senior year, 3 hours a week.

Lumbering.—PROFESSOR COOLIDGE. Development, methods, and business features. The development of the lumber industry in the United States; extent and importance of the industry; the lumber industry in the important sections of the United States; costs, methods of logging and manufacture; description, and discussion of the efficiency of logging and sawmilling machinery; products; grading rules; transportation; markets; trade relations and ethics. Lectures four times a week. First half, Senior year, credit 3 hours.

Lumbering Trip.—PROFESSOR COOLIDGE. During the Fall of Senior year, students visit lumber camps in company with the instructor, and make report on an extensive lumbering operation. In the Falls of 1909 and 1911 the sawmills and logging camps in the Arrow District of the Arapaho National Forest were inspected by the class. In the fall of 1910 a visit was made to the large mills within the San Juan National Forest in southern Colorado. The field trip lasts about ten days. The report consists of a detailed description of the methods and costs of the logging and manufacturing, and a description of the lumber industry in the region visited.

History of Forestry.—MR. TERRY. A brief discussion of the development of methods of forestry and of the organization of the National and State forest policies in Europe, India, and the United States. Lectures and assigned readings. Fernow's *History of Forestry* is used as a textbook. First half, Senior year, 2 hours a week.

Forest Management.—MR. TERRY. The methods of economic protection of forests. European and Indian methods and their conditions as compared with our own.

The economic principles underlying the management of forests, with special reference to private, State and National forest property.

The determination of the financial results of forest management. The present and future value of forest property based on productive power. The taxation of forest lands.

A critical study of working plans for forest property in

Europe, India, and the United States. Methods used to secure sustained productiveness. Field methods, forest description, protection, utilization, and administration.

The policy of the National Forest Administration, its organization, the duties of its officers, practice in making the customary reports, and the preparation of timber sales, permits, accounts, records, etc. A thorough study of the Rules and Regulations governing the National Forests. Lectures and reports. First half, Senior year, 3 hours a week.

The Practice of Forestry.—MR. TERRY. After the spring vacation the work of the Seniors will be transferred to Manitou Park or to some tract of timber on the National Forests of Colorado, where field work in topographic surveying, estimating timber, forest mapping, road building, and fireline construction will be carried on. A working plan for the timber land examined will be prepared.

Grazing.—PROFESSOR COOLIDGE, OR A MEMBER OF THE FOREST SERVICE. A thorough discussion will be held upon the live stock industry in its relation to the administration of the National Forests, upon matters bearing on the conservation of the range, and on State live stock law. Second half, Senior year, twenty lectures, field studies of forage plants and range conditions additional.

Roads and Trails.—MR. TERRY. Location, grades, construction, and costs. Logging roads, pack trails. The cost and construction of telephone lines. Twenty lectures, second half, Senior year.

Degree of Master of Forestry

Students who have been awarded a degree other than that of Forest Engineer, either at Colorado College, or at other institutions of high standing, will be awarded the degree of Master of Forestry upon completion of courses equivalent to those required for the degree of Forest Engineer, in Trigonometry, Graphics, Civil Engineering, Botany, Meteorology, Geology, and all courses in Forestry. Students who enter Colorado College with the intention of obtaining the degrees of Bachelor of Arts and Master of Forestry should be able to complete their course in six years. Such candidates for the degree of Bachelor of Arts should, while students in the College of Arts, major in Science. Graduates of other institutions who are can-

didates for the degree of Master of Forestry should, if they are well grounded in science, be able to obtain this degree in two years. Students of other institutions who have not studied Forestry cannot hope to obtain the degree of Master of Forestry in less than two years.

On account of the increasing demand that the technical forester have a broad, liberal education, the course leading to the degree of Master of Forestry is strongly recommended.

General Information

Credit will be given for parallel studies pursued at other institutions of high standing upon presentation to the Director of certificates that such studies have been satisfactorily completed. A fee for late registration will be charged, as in the College of Arts and Sciences.

The passing grade in all forestry subjects is seventy (C). A grade below sixty (E) is a failure, from sixty to sixty-nine (D), inclusive, is a condition. A condition may be removed by a subsequent examination. A failure means that the subject will have to be taken up again in a regular class. Any student who fails to carry the work is liable to suspension.

Students are urged to use their summer vacations as much as possible in practical work in Forestry, as on the National Forests or in the employ of lumber companies.

Students, 1911-1912

RANGER COURSE

NAME.	ADDRESS.	NATIONAL FOREST.
Bayer, Stanley	<i>Pinedale, Wyo.</i>	
Belknap, George Earle	<i>Pinedale, Wyo.</i>	Bridger.
Brown, Walter Greene	<i>Platteville, Colo.</i>	Colorado.
Burch, Ben	<i>Laramie, Wyo.</i>	Medicine Bow.
Clark, Frank Andrew	<i>Billings, Mont.</i>	Beartooth.
Clark, William Walter	<i>Colorado Springs.</i>	
Craig, Perry	<i>Alamosa, Colo.</i>	
Eames, John Owen	<i>Encampment, Wyo.</i>	Hayden.
Euler, Charles Warren	<i>Fraser, Colo.</i>	Arapaho.
Frey, Merle F.	<i>Leadville, Colo.</i>	Leadville.
Jensen, James	<i>Encampment, Wyo.</i>	Hayden.
Lee, Roger	<i>Colorado Springs.</i>	
McEvoy, William Gladstone	<i>La Veta, Colo.</i>	San Isabel.
MacRitchie, John	<i>Hillsdale, Mich.</i>	
Morton, Bert Benjamin	<i>Ten Sleep, Wyo.</i>	Bighorn.
Nisius, William	<i>Ormenburg-Eden, Germany.</i>	
Parker, Jean Lucien	<i>Greenfield, Mass.</i>	
Skinner, Edward Blanchard	<i>Colorado Springs.</i>	
Wintersteen, Clay	<i>Plateau City, Colo.</i>	Battlement.
Yates, Louis Sanford	<i>Alamosa, Colo.</i>	

TECHNICAL COURSE

Candidate for the Degree of Master of Forestry.

Snider, Paul Hustead, B. S. *Uniontown, Pa.*
 Washington and Jefferson College, '10.

Candidates for the Degree of Forest Engineer.

SENIORS.

Baker, Frederick Storrs *Beverly, Mass.*

JUNIORS.

Donovan, Andrew William *San Francisco, Calif.*
 Floyd, Joseph Ellenwood *Manchester, Mass.*
 Steuart, Charles *Palacios, Texas.*
 Stinson, Henry Curtis *Colorado Springs.*
 Thompson, Fayette Lathrop *New York City.*
 Jr.
 Vandemoer, Herbert Robinson *Denver, Colo.*

SOPHOMORES.

Appel, Robert Godfrey	<i>San Francisco, Calif.</i>
Black, Claude Raymond	<i>Victor, Colo.</i>
Colwell, Raymond Gardner	<i>Colorado Springs.</i>
Copeland, George Holliday	<i>Greeley, Colo.</i>
Cowdery, George Sabin, Jr.	<i>Denver, Colo.</i>
Hill, Fred Craig	<i>Colorado Springs.</i>
Lindstrom, Ernest Walter	<i>Chicago, Ill.</i>
Miller, Raymond Edward	<i>Hillsboro, Ohio.</i>
Moye, Ralph Albert	<i>Colorado Springs.</i>
Park, Nelson Renfrew	<i>Longmont, Colo.</i>
Sloey, Lance Claude	<i>Colorado Springs.</i>
Sternberg, Henry	<i>Woodbine, Ia.</i>
Summers, Herbert Gavin	<i>Spearfish, S. D.</i>
Tear, Alton Edward	<i>Painesville, Ohio.</i>

FRESHMEN

Adams, Clarence Morrison	<i>Steamboat Springs, Colo.</i>
Baker, Samuel William	<i>Erie, Penn.</i>
Cooke, Harold Percy	<i>Cheyenne, Wyo.</i>
Dennis, George Wesley	<i>Loveland, Colo.</i>
Gilmore, William Maynard	<i>Pueblo, Colo.</i>
Hall, Ralph Lyman	<i>Denver, Colo.</i>
Harder, William Frederic	<i>Chicago, Ill.</i>
Harrison, William DeWitt	<i>Goldfield, Colo.</i>
June, Perry Ellsworth	<i>Denver, Colo.</i>
Muncaster, Roy	<i>Denver, Colo.</i>
Parratt, Morris Ellsworth	<i>Highland Park, Ill.</i>
Rohl, Asmus	<i>Brooklyn, N. Y.</i>
Varker, William Metcalf	<i>Colorado Springs.</i>
Wakefield, Robert Brown	<i>Eureka, Kan.</i>
Young, Lukens Peirce	<i>Camden, N. J.</i>

SPECIAL STUDENT.

Rose, Frank Hubert	<i>Weir City, Kan.</i>
--------------------	------------------------



C
7122f
14/15

THE LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 73

BULLETIN SERIES NO. 44

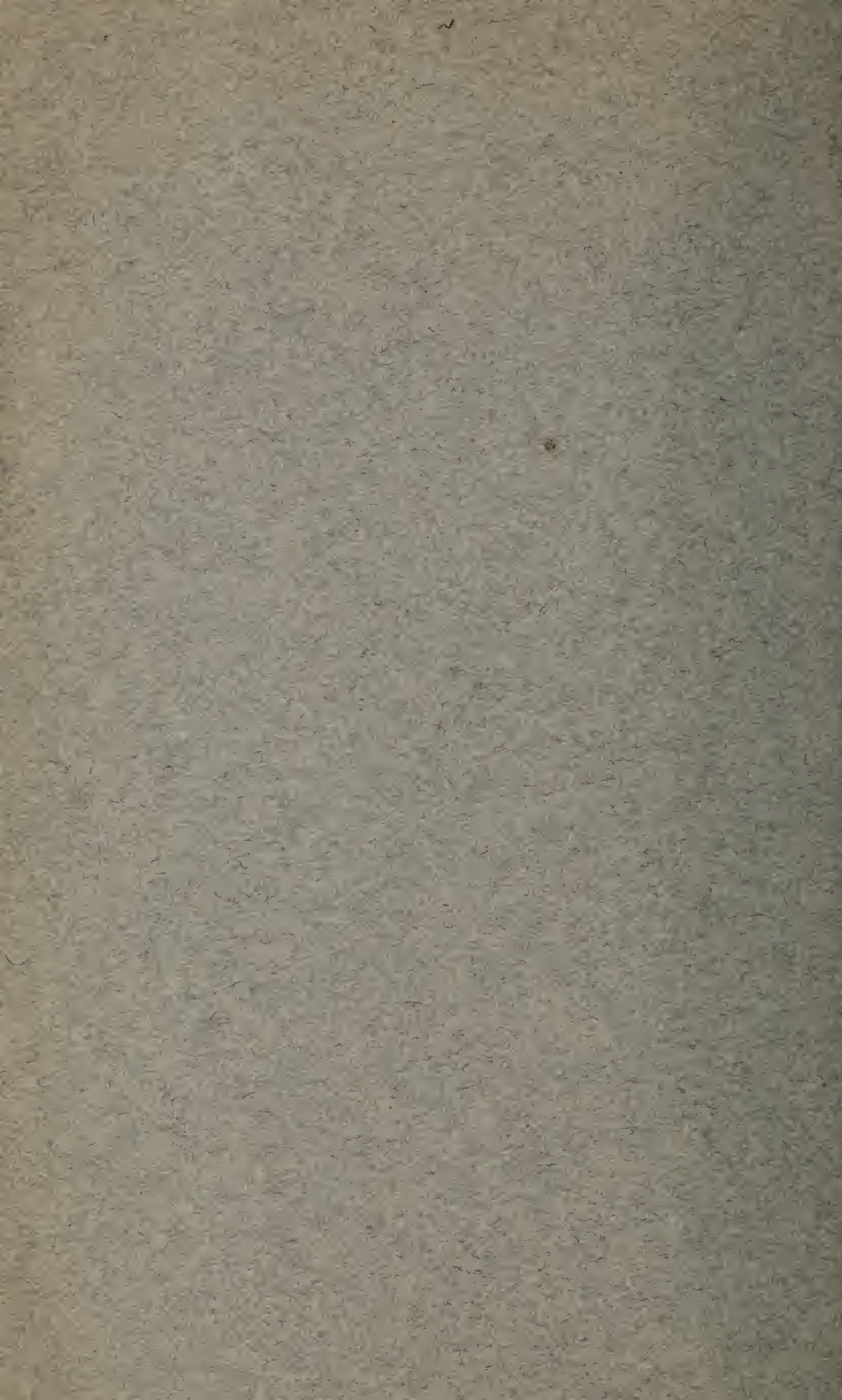
ANNOUNCEMENT Department of Forestry (COLORADO SCHOOL OF FORESTRY)

COLORADO SPRINGS, COLORADO

APRIL, 1914

Published by authority of the Board of Trustees of Colorado College every six weeks
during the Academic Year

Entered as second-class matter, September 23, 1905, at the Post Office in Colorado Springs, Colorado, under
Act of Congress of July, 1904



LIBRARY
OF
UNIVERSITY OF COLORADO
COLORADO COLLEGE PUBLICATION

GENERAL SERIES NO. 73

BULLETIN SERIES NO. 44

ANNOUNCEMENT
Department of Forestry
(COLORADO SCHOOL OF FORESTRY)

COLORADO SPRINGS, COLORADO

APRIL, 1914

Published by authority of the Board of Trustees of Colorado College every six weeks
during the Academic Year

Entered as second-class matter, September 23, 1905, at the Post Office in Colorado Springs, Colorado, under
Act of Congress of July, 1904

FACULTY

WILLIAM FREDERICK SLOCUM, D.D., LL.D.
President.

WILLIAM CODMAN STURGIS, PH. D.
Dean and Lecturer on Vegetable Pathology.

ELWOOD IDELL TERRY, S.B.
Director and Professor of Forestry.

CHRISTIAN HERMAN GOETZ, M. F.
Instructor in Forestry.

EDWARD CHRISTIAN SCHNEIDER, PH. D.
Head Professor of Biology.

FLORIAN CAJORI, PH. D.
Head Professor of Mathematics.

GUY HARRY ALBRIGHT, M. A.
Assistant Professor of Mathematics and Astronomy.

GEORGE EARL MARTIN, B. S.
Professor of Civil Engineering.

HOWARD MOORE, C. E.
Assistant Professor of Graphics.

WILLIAM STRIEBY, Sc. D.
Head Professor of Chemistry.

ROLAND RAY TILESTON, A. M.
Assistant Professor of Physics.

ELIJAH CLARENCE HILLS, PH. D., LIT. D.
Head Professor of Romance Languages and Literatures.

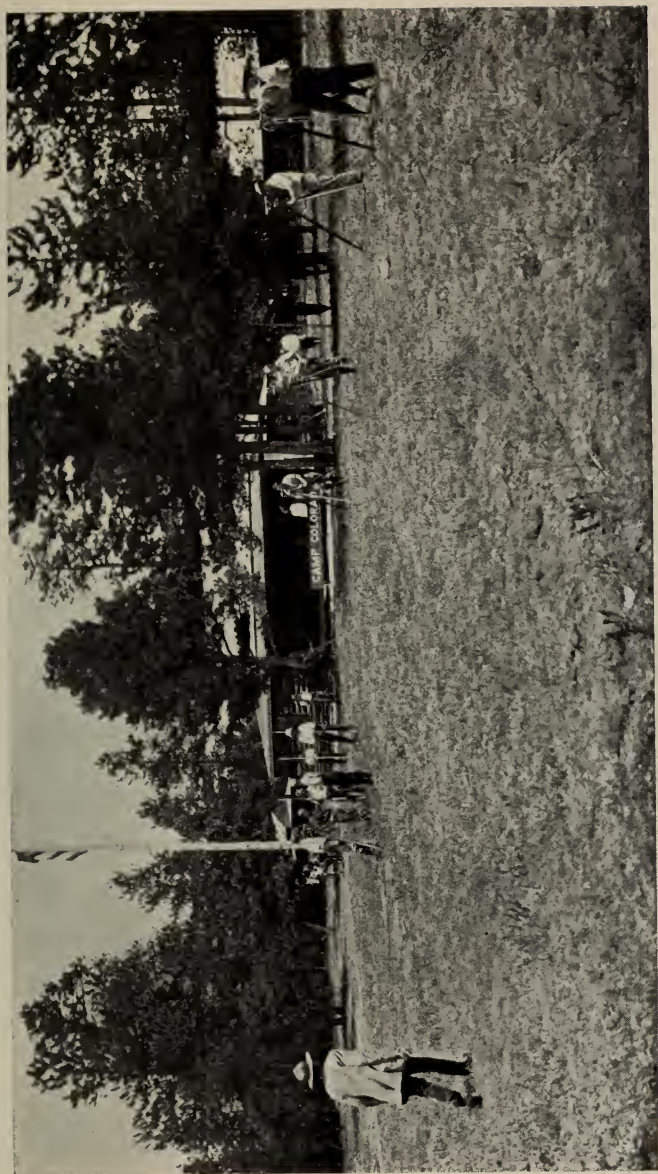
GEORGE MAXWELL HOWE, PH. D.
Head Professor of the German Language and Literature.

HOMER EDWARDS WOODBRIDGE, A. M.
Professor of English.

ROGER HENWOOD MOTTEN, A. B.
Professor of English.

WARREN MILTON PERSONS, B. S.
Professor of Economics.

GEORGE ALEXANDER BARKER, M. S.
Instructor in Geology.



CAMP COLORADO, MANITOU FOREST.

Field Instruction in Forestry.

Field Practice in Surveying.



PART OF THE MANITOU FOREST IN THE FOREGROUND—PIKES PEAK IN THE DISTANCE.

DEPARTMENT OF FORESTRY

Forestry as a Profession

The increasing demand for the practice of Forestry throughout the United States on both public and private lands is the result of the rapid depletion of our forests. Changes in methods of lumbering, better forest fire protection, and the reforestation of denuded areas are urgently needed if there is to be a timber supply in the future and if the sources of the waters now used for domestic purposes, power and irrigation are to be protected.

No profession offers greater opportunities for individual success through public service than Forestry. Yet success in this work can be won only by conscientious and unstinted devotion. The discomforts due to weather or isolation in the field test unfailingly the forester's capacity for success. Forestry should not be selected as a profession except by those with enthusiasm for the work and with sound health. No man can expect to prepare himself for Forestry unless he is ready for the hard study which masters detail and for the rough life of the woods. A thoroughly trained forester must have complete detailed knowledge of his subject and abundant drill in its methods.

The opportunities for young men with a technical training in forestry are rapidly increasing in this country. The National Forest Service and State departments of forestry will continue to offer employment to a large number of properly qualified applicants. But the greatest openings in the future will undoubtedly be found in the field of private endeavor,—with lumber companies, railroads, wood-pulp and paper companies and large wood-using industries, such as furniture manufactories, which will own their timber lands and manage them so as to obtain a continuous supply of raw material. In all these lines of productive activity the demand for foresters and opportunities for advancement are growing rapidly.

THE FORESTRY CURRICULUM

A General Description of Its Methods and Objects

The Colorado School of Forestry was established as a department of Colorado College in 1905, when General W. J. Palmer and Dr. W. A. Bell gave to the College a tract of 9,500 acres known as Manitou Park, situated in a mountain valley about 25 miles northwest of Colorado Springs. About 3,200 acres is agricultural land and has been devoted to that purpose, the proceeds being applied toward the endowment of the School. The remainder, now called the Manitou Forest, is timbered and is used for field instruction. The Manitou Forest itself is surrounded on three sides by the Pike National Forest, to which the students have access for the purposes of estimating timber and studying the various problems of forest management.

THE MANITOU FOREST—THE FIELD LABORATORY

The forest consists of a nearly pure stand of western yellow pine with a small admixture of Douglas fir and blue spruce. Nearly the whole tract has been culled lightly during the last thirty years for the largest trees. The growth has been rapid and the resulting forest consists of a large proportion of timber just reaching maturity. The density is much greater than in virgin stands of western yellow pine, while reproduction is abundant. Other species of timber are found in the Pike Forest.

FOREST EXPERIMENT STATIONS AND NURSERY

In addition to these natural advantages, the location of the School at Colorado Springs affords to the student the opportunity of studying other important branches of forestry that are being developed by the Forest Service. Eight miles west of the city, on the slopes of Pikes Peak, is situated the Fremont Experiment Station, where extensive forest investi-

gations are being conducted. The practical purpose underlying these investigations is to find out how best to reproduce, develop and manage the forests of the Rocky Mountain region. A short distance north is the Monument Nursery, where a million seedlings are grown each year to be set out on the denuded lands in the National Forests.

The United States Bureau of Entomology has recently established at Colorado Springs a forest insect station for the study of the insect problem in the Southern Rocky Mountains. An insectary will be maintained in connection with it for the breeding of the insect enemies of the tree-killing species. The location of this station at Colorado Springs will be of great advantage to the students of the Department in their study of forest entomology.

PURPOSE OF THE COURSE

With so fortunate a situation, the aim of the Department has been to train young men not only for Government positions, for which its facilities are exceptional, but for the kind of forest work, either on public or private lands, that is obviously most needed in this country today and especially in the West. The experience of the last twelve or fifteen years since the forestry movement was fully launched in this country has clearly shown that the successful American forester must first of all be a good woodsman, an expert timber estimator and a practical lumberman. No school of forestry can expect to turn out a finished product in all those branches, but the foundations should be so thoroughly laid that young men of the right stamp will be able to take up such work upon graduating and develop rapidly. The object of the School has been to strike the correct balance between instruction in technical forestry and training in practical woodsmanship. Such a preparation best equips the student to attack the problems now confronting the American forester and lumberman.

THE TWO-YEAR PROGRAM

In 1912 the forestry curriculum was thoroughly revised and a larger amount of practical field work introduced. All the forestry courses proper were consolidated into the junior and senior years, an arrangement which affords a stronger and more systematic presentation of the whole subject than was possible in the former curriculum, in which the forestry subjects were intermingled with others throughout the four-year period. This arrangement also enables the Department of Forestry to make full use of its most valuable asset—the Manitou Forest. A forest laboratory is the prime requisite of a school of forestry. When the Manitou Forest was given to the College for this purpose Mr. Gifford Pinchot, then chief forester of the United States, made the statement that the Colorado School of Forestry “has in Manitou Park the best out-of-door laboratory for forest experimentation in the country.” But under the old curriculum it was impossible to make adequate use of this magnificent tract of woodland. This has now been provided for by dividing both the junior and senior years into three terms—fall, winter, and spring—and giving the entire work of the fall term and part of the spring term (in the junior year) in the Manitou Forest.

The student entering Colorado College with the intention of studying forestry is registered for the first two years in the Department of Liberal Arts and pursues the regular studies of a general college course, but must include a certain amount of those subjects which are essential in laying the foundations for the study of forestry. Of prime importance are botany, geology, and surveying. The latter is studied in the Engineering Department. The field work is given at Manitou Park at the end of both the freshman and sophomore years—four weeks each year—where the student obtains abundant practice in handling instruments and executing practical problems in surveying. He thus becomes a proficient surveyor before taking up the study of forestry.



AN AREA CUT OVER ACCORDING TO THE SELECTION SYSTEM—MANITOU
FOREST.



BURNING BRUSH ON A CUTOVER AREA IN THE MANITOU FOREST.

THE FALL TERM

Junior Year.—In the junior year he enters the Forestry Department. During the fall term, from early in September to the last of November, the headquarters of the School are at Camp Colorado in the Manitou Forest. The camp consists of a group of buildings and tents that provide ample and comfortable accommodations. Instruction is given by daily lectures, recitations and field work. The juniors spend the first half of the term studying forest mensuration. Sawmills in the vicinity provide the opportunity for practice in log-scaling and the making of mill tallies. Measurements are taken of felled and standing trees and the data worked up into volume, growth, and yield tables.

The last half of the term is spent in forest surveying and timber estimating. After receiving a thorough drill on a number of sample "forties" the class goes on camping trips to different parts of the Pike National Forest, estimating and mapping large bodies of timber. Six miles northeast of Camp Colorado is a large area of lodgepole pine, farther west on the mountain slopes are dense forests of Engelmann spruce and in the Platte Valley between are tracts of virgin yellow pine. These are visited in turn, carefully estimated and topographic maps made of the tracts. An experienced mountaineer accompanies the party as cook and teaches each student the arts of camp-cooking and packing.

The juniors also begin the study of dendrology in the fall term. By study in the field they become familiar with the different species and forest types of the region. They are also given sufficient practice in timber operations—tree-felling, log-making, skidding, etc.—to make them proficient in the use of woodsmen's tools.

Senior Year.—The senior class during the fall term study forest management and forest improvement work, or

Construction Engineering. The field work in forest management involves the making of working plans for the Manitou Forest or adjacent tracts. At present each senior class constructs an intensive working plan for a portion of the Manitou Forest. When the whole area has been covered in this manner these plans will be combined into a uniform working-plan for the entire tract and the organizing of the forest will proceed in accordance with that plan. It has been conservatively estimated that when developed to its full-producing capacity the Manitou Forest will give a sustained annual yield of between 25,000 and 30,000 railway ties, or about 700,000 board feet of saw-logs. Tie timber is the most profitable forest product to raise in this section.

The course in Forest Improvement Work furnishes instruction in the building of forest roads, trails, bridges, fire-lines, telephone lines, lookout stations and ranger cabins. It is imperative that a forester acquire a thorough knowledge of these operations in order that he can lay out, estimate the cost of, and supervise such work. A large amount of construction engineering is always necessary on forests that are being put under scientific management and today forms one of the chief lines of work on our National Forests.

A few days of the fall term are spent in collecting the annual seed crop. At the proper time, just before the cones of the yellow pine and Douglass fir are ready to open, they are collected and spread out on canvas sheets to be opened by the sun. They are then thrashed out, cleaned and stored away to be used in the planting operations the following spring.

THE WINTER TERM

The winter term, from the first of December to April, is spent in Colorado Springs, when library, laboratory and wood-testing work is carried on in connection with the lectures and

recitations in the various technical courses. The wood-testing laboratory is well equipped for that purpose. Here is mounted a 100,000-pound Riehle testing machine for making tension, compression, shearing and transverse tests. Students are required to make a series of tests upon the resisting properties of various species of commercial woods.

THE SPRING TERM

Junior Year.—In the spring the work is again transferred to the field, but the two classes separate. The juniors spend part of the term in the Manitou Forest and part at the Government Nursery at Monument. They return to the Forest for the field work in silviculture, which consists in making thinnings, practice in marking timber for cutting, and in conducting various forest investigations and experiments, each experiment having as its object some definite, practical problem of forest management which has not yet been solved. The best methods of regenerating our cutover areas, of accelerating tree-growth and increasing the density of our stands are some of the problems to be worked out.

Each year the students will also do the planting on a portion of the open land in the Forest that must be restocked in that manner. Several weeks are spent at the Monument Nursery, where the class receives thorough instruction and practice in all the operations of a large forest nursery.

Senior Year.—The seniors visit some large lumbering center in the South, where they study logging and milling operations on a large scale. They also estimate an extensive tract of timber and make a logging plan for it. The spring of 1913 was spent at Crossett, Arkansas, where the facilities for such work are unexcelled.

In addition to the prescribed course as here outlined, the students are expected to gain further experience by

spending their summer vacations in some kind of practical forest work—either working for a lumber company or in the Forest Service. Most of them obtain employment on the National forests.

Forestry education in this country, like the profession of forestry itself, is just emerging from the experimental stage, and many schools of forestry have recently revised or are now revising their curricula in order to give the training that is most obviously needed. This purpose has been kept foremost in planning the curriculum for the Colorado School of Forestry. The object is to offer a well-balanced, fully-rounded course, which maintains as nearly as possible the correct proportions between instruction in theoretical forestry and practical lumbering.

Additional Advantages and Equipment

The Department is unusually well prepared to fit men for administrative work on the National Forests and to give the necessary instruction as to the administrative relations of the Forest Service to the grazing business, the mining business, and other enterprises characteristic of the West. Its location near the National Forests makes it possible to secure the frequent aid of Forest Service officers for lectures or instruction.

Besides the advantages afforded by the location and the ideal climate of Colorado Springs, the students have the advantages of Colorado College Scholarships, the College Library, the large and well-equipped laboratories of the Departments of Biology, Geology, Physics, Chemistry, and Engineering; the Museum, the Literary Societies, the College Lecture Course, and the use of Dormitories and Boarding Clubs.

A Foresters' Club meets fortnightly during the winter term to consider current events in forestry and to discuss papers of professional interest. Freshmen and sophomores preparing for the forestry course are welcomed to membership in the club.

The College has a good working equipment of axes, calipers, surveying instruments, meteorological instruments, and such other apparatus as is needed in the study and care of the forest.

REQUIREMENTS FOR THE DEGREE OF FOREST ENGINEER

The aim of the Department is to give to students who intend to adopt Forestry as a profession a thorough training which will fit them for positions in the Government Forest Service, or as State Foresters, teachers of Forestry, or expert foresters in private employ.

Students who have completed two years of College work (60 semester hours) in which the following courses or their equivalents have been included (see Colorado College catalogue), will be admitted to instruction in the Department of Forestry as candidates for the degree of Forest Engineer: Biology 1, 2, 3; Chemistry 1 or 2; Civil Engineering 1, 201, 5, 211; English 1 and 26 or 27; German 1, 3; Geology 1; Mathematics 1, 2, 3. Students who studied one or more than one modern language in preparatory school are advised to continue the study of that language in which they are most advanced. A reading knowledge of German is especially desirable. Further, the courses in Economics, Mineralogy, Meteorology, and Physics are commended as elective courses which will materially strengthen the student's Forestry Course.

The course in Forestry covers two years, and from the beginning of the college year until December 1 is conducted in the Manitou Forest, near Woodland Park, Colorado; from December 1 until the spring vacation in Colorado Springs; from the spring vacation until June 1 the Junior class is part of the time in the Manitou Forest and the remainder at the Monument Nursery, while the Senior class spends the spring term in the pine forests of Southern Arkansas.

Junior Year

HALF-YEAR
HOURS

Fall Term—Manitou Forest:

Forest Mensuration (see Forestry 1, page 14), first half of term.....	5
---	---

Forest Surveying and Timber Estimating (see Forestry 2, page 14); second half of term..... 5

See also Forestry 3, page 14; Forestry 7, page 16; and Forestry 10, page 17.

Winter Term—Colorado Springs:

Dendrology, (see Forestry 3, page 14); lectures or recitations 5 hours a week and 6 hours of laboratory work..... 5

Wood Technology, (see Forestry 4, page 15); lectures 2 hours a week and laboratory 4 hours..... 2

Silviculture, (see Forestry 5, page 15); lectures 3 hours a week and silvical field studies..... 3

Forest Protection, (see Forestry 6, page 15); lectures 4 hours a week..... 3

Spring Term—Manitou Forest and Monument Nursery:

Field Work in Silviculture, (see Forestry 5, page 15)..... 3

Forest Planting, (see Forestry 7, page 16)..... 7

Senior Year

Fall Term—Manitou Forest:

Forest Management, (see Forestry 8, page 16); lectures 5 hours a week and daily field or office work..... 7

Forest Improvement Work, (see Forestry 9, page 16)..... 3

Winter Term—Colorado Springs:

Forest Utilization, (see Forestry 10, page 17); lectures or recitations 5 hours a week..... 4

Forest Geography, (see Forestry 11, page 17); lectures or recitations 5 hours a week..... 4

Forest Policy, (see Forestry 12, page 17); lectures or recitations 5 hours a week..... 4

Spring Term:

Lumbering Operations, (see Forestry 13, page 17)..... 10

DESCRIPTION OF COURSES

1. *Forest Mensuration*.—The use and construction of log rules, the determination of the contents of logs in board, cubic, and cord measure; the contents of standing trees and exact methods of determining the contents of whole stands. The construction and use of volume and yield tables; the increment in diameter, height, and volume of single trees and whole stands; the determination of the age of single trees and stands. Lectures 5 hours a week and field work. First half of the fall term. Text-book: Graves' *Forest Mensuration*.
2. *Forest Surveying and Timber Estimating*.—Methods of making forest maps showing types and topography. Plane table and traverse board methods, measuring distances by stadia, chain, or pacing. Use of aneroid barometer, hand level and clinometer. Different methods of estimating timber. After a number of small areas in the Manitou Forest have been estimated by intensive methods, camping trips are taken to different parts of the Pike National Forest and large tracts of timber are estimated and mapped. Forest Service reconnaissance methods are compared with other methods of timber cruising. Last half of the Fall term. Graves' *Mensuration*; Cary's *Handbook for Northern Woodsmen*, and *The Woodsman's Handbook*, published by the Forest Service, are used for text and reference.
3. *Dendrology*.—Monographic study of the important forest trees of the United States; their classification, identification, distribution and silvical characteristics. During the Fall term field trips will be taken to familiarize the students with the forest flora in the Manitou Forest and surrounding region. The distribution of forest types in this part of the Rocky Mountains and the requirements of the species composing these types will be studied in their natural



EXTRACTING AND CLEANING PINE SEED—MANITOU
FOREST.



STUDENTS ESTIMATING TIMBER.



AN EXAMPLE OF NATURAL REGENERATION IN THE MANITOU FOREST.

habitat. Lectures or recitations 5 hours a week and 6 hours of laboratory work during the Winter term.

4. *Wood Technology*.—The structural, mechanical, physical and chemical properties of wood, including timber testing on Olsen and Riehle machines. The identification of the more important commercial woods. Both microscopic and gross structure are studied. Methods of wood-preservation. Lectures 2 hours and laboratory 4 hours a week during the Winter term.

5. *Silviculture*.—The physical foundations of silviculture— influence of temperature, light, moisture, soils, and other site factors on forest growth. The principal silvicultural systems, both of natural and of artificial regeneration, and the adaptability of these systems to American conditions. Thinnings and improvement cuttings. The field work will consist in collecting data for forest descriptions and for silvical descriptions of individual species—the data to be embodied in reports—and in making thinnings, improvement cuttings, and silvical investigations and experiments in the Manitou Forest during the Spring term. Lectures 3 hours a week and assigned reading during the Winter term.

6. *Forest Protection*:

(a) *General Protection*.—Protection from fire, animals, and adverse climatic influences.

(b) *Forest Entomology*.—A study of the life histories and habits of insects injurious to forest trees and products. Identification and methods of control.

(c) *Diseases of Trees*.—Injuries to trees caused by parasitic fungi; also the causes and effects of wounds and the treatment of such injuries. The course includes a consideration of normal and pathological physiology.

Field investigations of specific cases of injury by insects, fungi and other agencies during the Fall and

Spring terms. Lectures or recitations, 4 hours a week, and assigned reading during the Winter term.

7. *Forest Planting*.—At the proper time during the Fall term, the students will collect seed of yellow pine, Douglas fir, spruce, and other species growing in the Manitou Forest, to be used in the planting operations in the Spring. Experiments in different methods of direct sowing and planting will be carried on. Each student will prepare a planting plan for a portion of the Manitou Forest. Three or four weeks of the Spring term will be spent in nursery work at the Forest Service Nursery at Monument, Colorado, under the direction of the Nursery manager. (Monument is a half-hour's ride by rail from Colorado Springs.) Lectures, assigned reading, field work and reports during the Spring term.
8. *Forest Management*.—The valuation of forest land, methods of regulating the yield, and the preparation and execution of working plans for the management of forest property. The students will make a practical working-plan for a portion of the Manitou Forest, and from year to year each class will also help to execute the provisions of the general working-plan for the whole forest. Lectures, field and office work daily during the Fall term.
9. *Forest Improvement Work, or Construction Engineering*.—The location and construction of forest roads, trails, bridges, telephone lines, fire lines, lookout stations, ranger stations, and other permanent improvement work on the National Forests, will be studied by lectures, assigned readings and inspection. A complete fire-protective system of trails, fire-lines, lookout stations and telephones is being planned for the Manitou Forest and adjacent districts of the Pike National Forest, and will be carried out under a co-operative agreement with the Forest Service, the students doing a portion of the work.

10. *Forest Utilization*.—The development of the lumber industry. Methods and costs of lumbering, milling, and marketing in the different forest regions. Minor forest products. Lectures and recitations 5 hours a week during the Winter term. Bryant's *Logging* is used as text-book. During the Fall term the students will participate in the harvesting of the annual cut from the Manitou Forest—thus obtaining practice in felling, log-making, skidding, and other logging operations.
11. *Forest Geography*.—The forest regions of the United States; detailed descriptions of the more important forest types and of commercial tree species; methods of silviculture and management adapted to these types; the National Forests; a few lectures on the forests of Canada, Alaska, the Hawaiian and Philippine Islands, and Mexico. The physiography of the United States will be considered in connection with the forest regions. Meteorology and the Climatology of the United States will be treated in a general way, especially in their relation to forest growth and distribution. This course will also provide a comprehensive review of the courses in Dendrology and Silviculture, which will be of value to students preparing for the civil service examination. Lectures or recitations 5 hours a week and assigned readings during the Winter term.
12. *Forest Policy*.—History of the development of forest policies and administrative methods under the influence of economic and political conditions; forest legislation and administration of selected foreign countries; Federal and State forest laws; the organization of the Forest Service and its administration of the National Forests. Forest taxation. Fernow's *History of Forestry* and *Economics of Forestry* are used for reference. Lectures or recitations 5 times a week during the Winter term.
13. *Lumbering Operations*.—The Senior class will spend the Spring term on some timber tract where extensive logging

and saw-milling operations are in progress. They will study these methods in detail, considering the costs of the various operations, business organization and methods, efficiency of labor and of equipment. They will also estimate the timber and make a logging plan for the tract. The building of logging railroads will be thoroughly studied on the ground. The work will round out and also comprise a resume of the courses in Forest Surveying and Estimating, Forest Management and Forest Utilization.

Degree of Master of Forestry

Students who have been awarded a degree other than that of Forest Engineer, either at Colorado College or at other institutions of high standing, will be awarded the degree of Master of Forestry upon completion of courses equivalent to those required for the degree of Forest Engineer, in Trigonometry, Graphics, Civil Engineering, Botany, Geology, and all courses in Forestry. Students who enter Colorado College with the intention of obtaining the degrees of Bachelor of Arts and Master of Forestry should be able to complete their course in six years. Such candidates for the degree of Bachelor of Arts should, while students in the College of Arts, major in Science. Graduates of other institutions who are candidates for the degree of Master of Forestry should, if they are well grounded in science, be able to obtain this degree in two years. Students of other institutions who have not studied Forestry cannot expect to obtain the degree of Master of Forestry in less than two years.

On account of the increasing demand that the technical forester have a broad, liberal education, the course leading to the degree of Master of Forestry is strongly recommended.

Expenses

Tuition by the year (in Department of Arts and Science)	\$50.00
Tuition in Department of Forestry (one-third payable at the beginning of each term).....	60.00



MANITOU PARK—LEAVING FOR A DAY'S SURVEYING.



STUDENTS MAKING TOPOGRAPHIC AND FOREST MAP.

Matriculation	5.00
Graduation	5.00

Annual Fees:

Library Fee	3.00
Athletic Fee	4.00

Railway and stage fares to and from the Manitou Forest or to points on the National Forests amount to \$10 or \$15 a year. The total necessary expenses of the Senior trip during the Spring term will not be over \$125. Books and stationery should not cost over \$10 a year.

Board:

In young men's clubs, a week.....	\$3.50 to \$5.00
In the city, a week	4.00 to 8.00
At Camp Colorado	25 cents a meal

Furnished Rooms:

In College Dormitory,* by the year.....	\$40.00 to \$80.00
In the City, by the month.....	from \$7.00 up
No charge for lodging at Camp Colorado.	

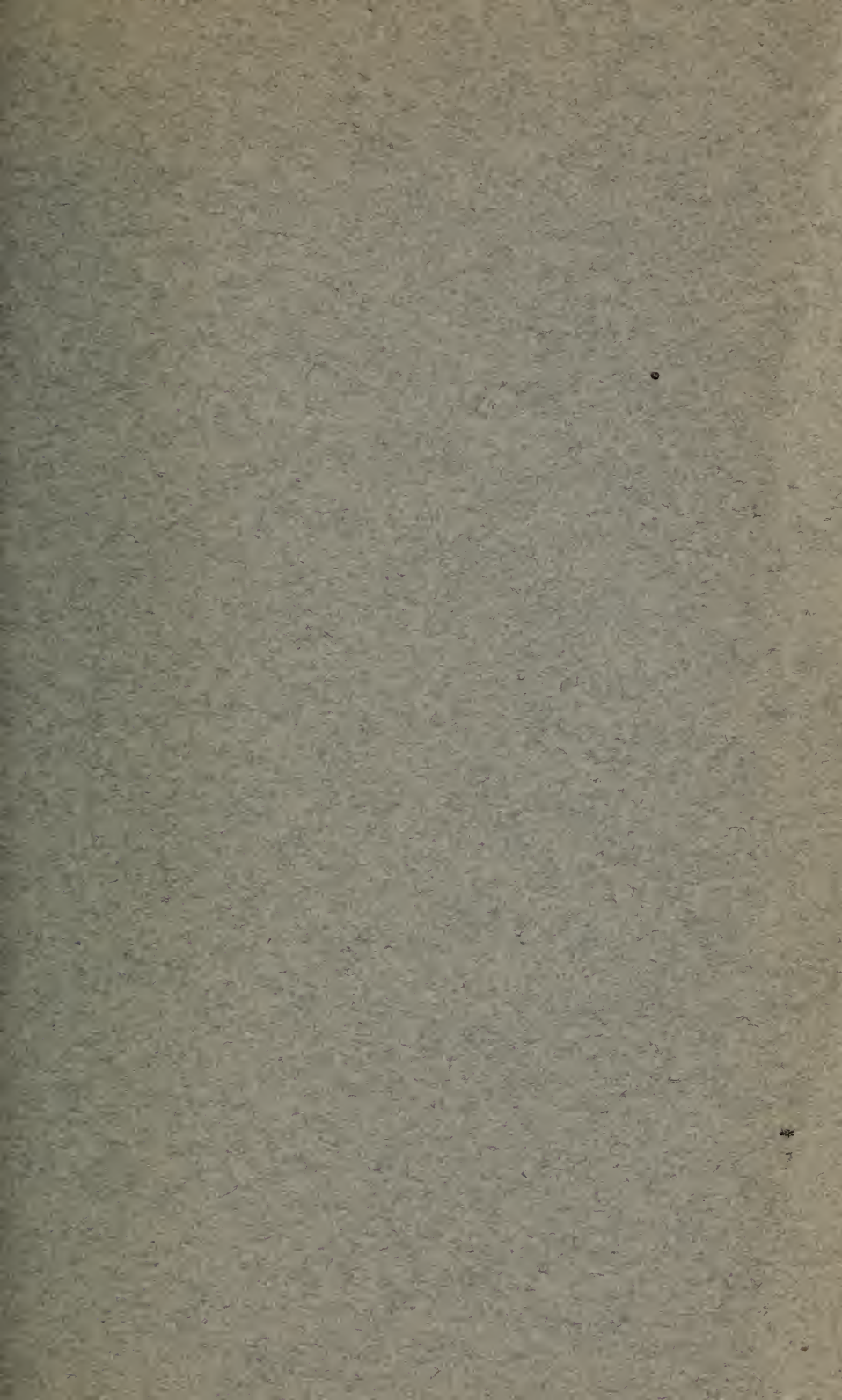
*Students furnish towels and bed linen.

GENERAL INFORMATION

Credit will be given for parallel studies pursued at other institutions of high standing upon presentation to the Director of Certificates that such studies have been satisfactorily completed. A fee for late registration will be charged, as in the College of Arts and Sciences.

The passing grade in all forestry subjects is seventy (C). A grade below sixty (E) is a failure, from sixty to sixty-nine inclusive (D), is a condition. A condition may be removed by a subsequent examination. A failure means that the subject will have to be studied again in a regular class. Any student who fails to carry the work is liable to suspension.

Students are urged to use their summer vacations doing practical work in Forestry, as on the National Forests or in the employ of lumber companies. Summer employment can usually be obtained for students desiring it.



2 f
20/21

Colorado College Publication

BULLETIN SERIES 54

GENERAL SERIES 106

THE LIBRARY OF THE
UNIVERSITY OF CHICAGO
JUL 20 1921

Announcement
COLORADO SCHOOL OF FORESTRY

JULY, 1920

Published by authority of the
Board of Trustees of Colorado Col-
lege, every six weeks during the
academic year.

Entered as second-class matter
September 23, 1905, at the Post
Office at Colorado Springs, Colo-
rado, under Act of Congress of
July 16, 1894.

COLORADO COLLEGE PUBLICATION

BULLETIN SERIES 54

GENERAL SERIES 106

THE LIBRARY OF THE
APR 20 1931
UNIVERSITY OF ILLINOIS.

ANNOUNCEMENT
COLORADO SCHOOL OF FORESTRY

JULY, 1920

Calendar

1920

- Sept. 14. Registration. Residence halls open.
15. First half-year begins at 8 a. m.
For forestry freshmen and sophomores, at Colorado Springs.
For forestry juniors and seniors, at Manitou Forest.
Nov. 24. Thanksgiving Recess begins at 5 p. m.
29. Thanksgiving Recess ends at 8 a. m.
Forestry juniors and seniors begin classes at Colorado Springs.
Dec. 17. Christmas Recess begins at 5 p. m.

1921

- Jan. 4. Christmas Recess ends at 8 a. m.
22. Mid-year examinations begin.
31. Second half-year begins at 8 a. m.
Feb. 22. Washington's Birthday, a holiday.
Mar. 24. Spring Recess begins at 5 p. m.
April 5. Spring Recess ends at 8 a. m.
Forestry juniors return to Manitou Forest.
Forestry seniors start on logging trip.
May 30. Memorial Day, a holiday.
June 4. Examinations begin.
6. Summer School of Surveying opens at Manitou Forest.
12. Baccalaureate Sermon.
13. Class Day.
15. Commencement.

Faculty

CLYDE AUGUSTUS DUNIWAY, PH. D., LL. D.
President

GUY HARRY ALBRIGHT, A. M.
Professor of Mathematics and Astronomy

FLORENCE MAY BRUMBACK, A. M.
Instructor in Biology

RALPH JOHN GILMORE, PH. D.
Professor of Biology

I. ALLEN KEYTE, B. S. in Ed.
Instructor in Geology

WILLIAM V. LOVITT, PH. D.
Associate Professor of Mathematics

FRANK MORRIS OKEY, B. C. E.
Associate Professor of Civil Engineering

GORDON PARKER, M. F.
Assistant Professor of Forestry

GEORGE KYNETT PATTEE, A. M.
Professor of English

CHARLES HERSCHEL SISAM, PH. D.
Professor of Mathematics

WILLIAM STRIEBY, A. M., E. M., Sc. D.
Head Professor of Chemistry and Metallurgy

ROLAND RAY TILESTON, A. M.
Professor of Physics

Opportunities for Foresters

Forestry, the art of raising and utilizing repeated crops of forest products—usually from lands unsuitable for agriculture,—is a comparatively new profession in the United States. The first professional teaching of the subject at a forestry school in this country was begun in 1898. At the present time there are some two thousand trained foresters in the United States, so that the profession of forestry can reasonably be said to have outgrown its infancy, although still, to be sure, in its early youth.

The openings for the forestry graduate are various. There is the great lumber business with its very steadily growing demand for competent, trained foresters; the large lumber associations; inspectors or timber experts or appraisers for owners of or dealers in large forest tracts, such as some of the pulp and paper companies or the railroads; private enterprise as consulting forester or in handling privately-owned forests or estates; teaching of forestry; State or City forestry work; or the National Forest Service. In the Forest Service of the United States the entrance salary for Forest Assistants—the usual initial appointment for the forestry graduate who is successful in passing the Civil Service examination—was raised in 1920 from \$1100 to \$1500 a year. This figure can be taken as a rough guide to the entrance salaries in other positions.

“Forestry Training in the Heart of the Rockies.”

The intimate personal familiarity which the successful forester must have with his forest in order to plan wisely for its handling and protection cannot be learned or acquired accurately anywhere else than in the forest itself. Teaching forestry by lectures and text-books alone is therefore unsatisfactory in method and results. The training for such work should be given largely in the woods where the student can come readily into direct contact with the conditions he is studying.

In this respect the Colorado School of Forestry is ideally situated and equipped. The School was established as a Depart-

ment of Colorado College in 1905 by General William J. Palmer and Dr. W. A. Bell through their presentation to the College of a tract of about 10,000 acres of timber and farming land. This tract, called Manitou Park, lies some 25 miles northwest of Colorado Springs, (7 miles north of Woodland Park on the Colorado Midland Railroad), up in the Rocky Mountains at an elevation of approximately 8,000 feet. Some 3,200 acres of the agricultural land have been sold and the proceeds applied toward an endowment for the School.

The remainder of the area, now known as the Manitou Forest, is well timbered with a relatively young stand of western yellow pine and Douglas fir. Excellent buildings and other camp facilities are provided so that the tract can be most advantageously used as a great field laboratory for forestry study, experiment and research. And such use is made of the area, much of the junior and senior years being spent at Camp Colorado, as the camp is called. The first cuttings in this timber were made some 40 years ago, and the results of this and subsequent operations, as they affect the remaining stand of timber, are studied on the ground. As opportunities offer from time to time the mature timber from the Forest will be sold and the logging and milling operations will be carefully studied as they progress. The adjoining Pike National Forest also offers similar possibilities when operations on the College timber are not in progress.

Course of Study

The aim of the Colorado School of Forestry is to give students who intend to adopt forestry as a profession a thorough technical training in the fundamentals of the art, and at the same time to develop as far as possible strong, mature men with broad outlook and individual self-reliance. The work of a forester covers many different lines and needs a knowledge of many other subjects besides the various divisions of forestry proper. He must know more than a smattering of chemistry, botany, mathematics and surveying, physics and geology. And in addition to his technical knowledge he must be a well-rounded man who can meet and do business with other men, who can take his place among the leaders of his community. It is with this end in view that the course of study at the Colorado School of Fores-

try has been developed,—to give as well-rounded an education as possible within the limits of a college course and at the same time cover the essential work which a forester must have. The course will prepare the student for positions in the Federal Forest Service or in other lines of forestry work, or for advanced study in forestry.

A four-year undergraduate course is offered. It is so designed that practically all of the technical study of forestry is concentrated in the junior and senior years. This is practically essential since so much of the forestry study is done in the field—at Manitou Forest or elsewhere—that it is impractical to keep up other college courses at the same time. The freshman and sophomore years are therefore given over to the necessary preliminary work in other Departments of Colorado College. In the junior year about two months each in fall and spring are spent at Manitou Forest, the intervening winter months being given to lectures and study at the College. The senior year is similarly divided except that it is planned that the spring term will be spent in practical work, usually on some relatively large lumbering operation. For the satisfactory completion of this course the College offers the degree of Bachelor of Science in Forestry.

The degree of Master of Forestry is offered to graduates of recognized colleges or universities for satisfactory completion of two years of graduate work in the Colorado School of Forestry. The ground to be covered is substantially the same as that which undergraduates must cover, it being presumed that the candidate will have completed the preliminary work in his undergraduate course so that the entire time can be devoted to the study of forestry alone. A thesis upon some approved technical problem in forestry will also be required. A higher grade of scholarship will naturally be demanded of candidates for the Master's degree than of undergraduates, since the higher degree is intended to represent something of real accomplishment rather than the perfunctory covering of certain prescribed ground.

An opportunity is offered to men spending five years in the study of forestry at Colorado College to secure both the degrees of Bachelor of Science and Master of Forestry within that time. Candidates intending to work for these degrees should consult

with the Department of Forestry immediately on entering the College so that their courses can be properly selected from the very start. The Bachelor's degree will be given on successful completion of the fourth year and the Master's degree at the end of the fifth. The thesis and the higher grade of scholarship will be required during the fifth year, as discussed in the preceding paragraph.

To be accredited as passing work, a course must be graded not lower than 60%.

Terms of Admission

Before registering each candidate must present to the Dean a certificate of moral character, signed by some responsible person in the community in which he has made his home. Students must register promptly and attend the first exercise in their courses.

THE ENTRANCE REQUIREMENTS FOR THE COLORADO SCHOOL OF FORESTRY ARE AS FOLLOWS:

1. MATHEMATICS 3 units.* Algebra (including Binomial Theorem, Progressions, Permutations and Combinations); Plane, Solid and Spherical Geometry.
2. PHYSICS 1 unit.
3. CHEMISTRY 1 unit.
4. ENGLISH 3 units. This includes a practical knowledge of grammar and the elements of rhetoric and a study of certain selected works.
5. FOREIGN LANGUAGES 2 units. French, Spanish, German, Latin, or Greek.
6. HISTORY 1 unit. American, English, or Ancient History.
7. ELECTIVES 4 units. Preferably in Mathematics, Modern Languages and History. It is extremely desirable that plane trigonometry be offered for entrance, in order to lighten up the otherwise heavily-loaded second half of the freshman year.

* A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 40 minutes each a week. Only one unit of deficiency is allowed for entrance.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements will be admitted without condition into the freshman class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

Curriculum

The program of study for the four-year course as it is outlined below covers the essentials of the work which it is felt that a forester must have. Because of the wide field to be covered and the comparatively short time available for it in the four years, very little flexibility or choice remains for the student, to meet individual desires. For this reason particularly, as well as because of the fuller, broader training which it provides, the five-year course previously described is urgently recommended. The additional courses to be taken are arranged to suit individual cases after consultation with the head of the Department of Forestry. A few of the very desirable courses suggested are in Economics, Accounting, Cost Keeping, Mineralogy, Meteorology, Advanced English, stronger courses in Mathematics and Physics than those prescribed, etc.

THE SCHEDULE FOR THE FOUR-YEAR COURSE IS AS FOLLOWS:

FRESHMAN YEAR

	First Half	Second Half
Elements of Biology (Biology 1) (Including both Botany and Zoology).....	3 hours	3 hours
Advanced Chemistry (Chemistry 2).....	3	3
Algebra (Mathematics 1)	3	..
Plane Trigonometry (Mathematics 3).....	..	2
Rhetoric and Composition (English 1).....	3	3
Mapping (Graphics 6)	1	..
Surveying Theory (Civil 1).....	..	2
Elementary Forestry (Forestry 1).....	1	..
Modern Language	3	3
Physical Education ..1.....	1	1
Credit Hours	18	17

Immediately at the close of the freshman year a four weeks' field course in Surveying Practice (Civil 201) is given at Manitou Park. Credit, 4 hours.

SOPHOMORE YEAR

	First Half	Second Half
General Geology (Geology 1).....	3 hours	3 hours
Botany of Seed Plants (Biology 3).....	3	..
Plant Physiology and Ecology (Biology 35) ..	..	3
General Physics (Physics 1 and 2).....	3	3
Advanced Surveying Theory (Civil 5).....	2	..
Field Astronomy (Civil 2).....	..	3
Elementary Local Dendrology (Forestry 2) ..	1	..
Modern Language	3	3
Physical Education	1	1
Credit hours.....	16	16

Immediately at the close of the sophomore year a four weeks' field course in Advanced Surveying Practice (Civil 211) is given at Manitou Forest. Credit, 4 hours.

JUNIOR YEAR

	Credit Hours
Fall term (9 weeks at Manitou Forest)	
Dendrology (Forestry 20).....	2
Fundamentals of Silviculture (Forestry 21).....	3
Forest Measurements (Forestry 22).....	3
Winter Term (13 weeks at Colorado Springs)	
Advanced Silviculture (Forestry 10).....	3
Dendrology (Forestry 11).....	2
Wood Structure (Forestry 12).....	3
Forest Products and Utilization (Forestry 13).....	3
Forest Protection (Forestry 14).....	2
Physical Education 3a.....	1
Spring Term (8 weeks at Manitou Forest)	
Forestation (Forestry 23).....	3
Dendrology (Forestry 24).....	2
Forest Entomology and Pathology (Forestry 25)	2
Credit hours.....	29

SENIOR YEAR

	Credit Hours
Fall Term (9 weeks at Manitou Forest)	
Forest Working Plans (Forestry 40).....	5
Forest Investigations (Forestry 41).....	3
Winter Term (13 weeks at Colorado Springs)	
Forest Management (Forestry 30).....	3
Logging and Lumbering (Forestry 31).....	5
Forest History and Policy (Forestry 32).....	2
Mechanical Properties of Wood (Forestry 33).....	2
Forest Construction Engineering (Forestry 34)....	2
Spring Term (7 weeks on Logging Field Trip)	
Logging Plans (Forestry 42).....	7
Credit hours.....	29

Description of Courses

Elements of Biology (Biology 1). A broad general view of the fundamental facts and principles of plant and animal life. The forms, life histories, structures, activities and adaptations of representative forms are carefully studied, with the most important evolutionary tendencies which they exhibit. Each half freshman year—Lectures and recitations, 3 hours; laboratory work, 4 hours. Credit, 3 hours.

Advanced Chemistry (Chemistry 2). The lectures treat chiefly of inorganic chemistry, but half of the second semester is given to organic chemistry. The principles of chemical science are studied, the chemical laws and their methods of deduction, and chemical reactions. The applications of chemistry to the arts, to sanitary science, and to common uses are made prominent. Each half freshman year—Lectures, 3 hours; quiz, 1 hour; laboratory work, 4 hours. Credit, 3 hours.

Algebra (Mathematics 1). Graphs, variation, linear equations, theory of exponents, quadratic equations, progressions, permutations and combinations, theory of equations. First half freshman year—3 hours.

Plane Trigonometry (Mathematics 3). Logarithms, the func-

tions of one and two angles, inverse functions, the solution of triangles. This course is required of freshmen in forestry who do not present entrance credit for it. Second half freshman year—2 hours.

Rhetoric and Composition (English 1). Exercises in composition and readings chosen to represent the principal literary types to make clear in theory and practice the general rhetorical principles and rules applicable to all kinds of prose composition. Each half freshman year—3 hours.

Mapping (Graphics 6). A special course for forestry students in the practical work of making and lettering maps. First half freshman year—3 hours. Credit, 1 hour.

Surveying Theory (Civil 1). Theory of plane surveying, construction, use, care and adjustment of instruments, computation of areas and volumes, map specifications. Second half freshman year—Recitations and problems, 2 hours.

Elementary Forestry (Forestry 1). This is planned to give the forestry student at the beginning of his course a general introduction to the subject. It takes up the economic importance of forestry in the National life, the general objects whose attainment is sought by the forester, a broad view of the profession as a whole, and a brief outline of the work to be covered in the entire course, showing the correlation of the subjects to be studied. First half freshman year—Lectures and discussions, 1 hour.

Modern Language. Students who enter College with some knowledge of a modern language will probably do well to continue the study of that same language. Courses are offered in French, German, Italian, and Spanish.

A reading knowledge of German is very useful to the forestry student because much technical writing of value upon that subject has been done in German. To a forester who has any thought of practicing his profession in the Southwest of the United States a knowledge of Spanish might be valuable in dealing with the Mexicans found in that part of our Country.

A few of the courses offered are described below:—

Elementary French (French 1). Reading, grammar, composition, writing from dictation, and practice in speaking. Each half year—3 hours.

Intermediate French (French 2). Syntax and prose composition, readings from selected authors, and oral work based on texts read. Each half-year—3 hours,

Elementary German (German 1). Reading, grammar, composition, conversation. The "direct method" of instruction is used. Each half-year—3 hours.

Scientific German (German 3). Designed to give the student a reasonable degree of facility in reading technical German such as is usually found in forestry or other scientific articles. Each half-year—2 hours.

Elementary Italian (Italian 1). Reading, grammar, composition, dictation. Each half-year—3 hours.

Italian Literature (Italian 2). Modern prose, lectures and reading. Each half-year—3 hours.

Elementary Spanish (Spanish 1). Reading, grammar, composition, writing from dictation, and practice in speaking. Each half-year—3 hours.

Intermediate Spanish (Spanish 2). Lectures, readings from selected authors, oral work based on texts read, syntax and prose composition. Each half-year—3 hours.

Physical Education. Elementary work in marching, calisthenics, gymnastic dancing, heavy apparatus, and games of the competitive type. Each half freshman year—3 hours. Credit, 1 hour.

Surveying Practice (Civil 201). Field practice in plane surveying. Four weeks at Manitou Forest during June, freshman year. Credit, 4 hours.

General Geology (Geology 1). Dynamical, structural and historical geology. Each half sophomore year—Lectures and discussions, 3 hours; laboratory and field work, 2 hours. Credit, 3 hours.

Botany of Seed Plants (Biology 3). The structures and functions of seed plants, including the influence of environment, distribution, variation, heredity and classification. First half sophomore year—Lectures and recitations, 2 hours; laboratory and field work, 4 hours. Credit, 3 hours.

Plant Physiology and Ecology (Biology 35). A study of the processes involved in the material income and outgo of plants, their nutrition, metabolism and growth as individuals. Plants *en masse* are studied later with relation to their physiographic environment, showing the tendency of vegetation to work toward a climax forest condition. Second half sophomore year—Lectures and recitations, 2 hours; laboratory and field work, 4 hours. Credit, 3 hours.

General Physics (Physics 1 and 2). A course offered especially for students (like those in forestry) who have only a limited time they can give to this subject and wish to secure the fundamentals of it in a single year. The lectures are illustrated by lantern slides and by experiments of historical interest. Each half sophomore year—Lectures and recitations, 3 hours; laboratory work, 4 hours. Credit, 3 hours.

Advanced Surveying Theory (Civil 5). Theory of topographic, hydrographic, geodetic, city, and mine surveying, stadia measurements and plane table. First half sophomore year—Recitations, lectures and problems, 2 hours.

Field Astronomy (Civil 2). The determination of latitude, longitude, azimuth and time by means of sextant, engineer's transit and chronometer. The application of astronomy to surveying problems. Second half sophomore year—Recitations, 2 hours; field work, 3 hours. Credit, 3 hours.

Elementary Local Dendrology (Forestry 2). A brief study of the trees and shrubs found in Colorado Springs and the nearby mountains, particularly in their autumn and winter aspects. Some brief field trips will be arranged. First half sophomore year—1 hour.

Physical Education 2. A continuation of Course 1 with wider scope, more varied methods, and greater emphasis on correctness and readiness of response. Each half sophomore year—2 hours. Credit, 1 hour.

Advanced Surveying Practice (Civil 211). Field practice in advanced surveying. Four weeks at Manitou Forest during June, sophomore year. Credit, 4 hours.

Dendrology (Forestry 20). A study of the trees and shrubs found in the vicinity of Manitou Forest, in order to begin the student's acquaintance with the forest flora of the

vicinity and the relations of the different species and their environment. A general introduction to the subject, to be followed up more fully in the continuation of the course in the succeeding term. Fall term junior year—2 hours.

Fundamentals of Silviculture (Forestry 21). The foundations of silviculture as applied to the study, description and treatment of local forest crops, taking up the factors governing the distribution, life history, growth and natural reproduction of forests; the silvics of local species; the principles of forest cuttings for improvement and reproduction, and practical work in marking for such cuttings; practice in the accurate analysis of forest conditions in the field; forest description. Fall term junior year—3 hours.

Forest Measurements (Forestry 22). The determination of the volume and growth in commercial units, of trees and stands of trees; measurement of logs and cordwood; construction and use of log scales, volume tables and yield tables. Practical work in the field is an important part of this course. Fall term junior year—3 hours.

Advanced Silviculture (Forestry 10). The forest regions of the United States with reference to physiography and climate; distribution, composition and life history of the forests; the various silvicultural systems, their objects and results. Winter term junior year—3 hours.

Dendrology (Forestry 11). A continuation of Forestry 20, taking up the forest trees of North America, particularly those of economic importance. Special attention will be given to identification of the various species in different stages of growth and in summer and winter aspects. Winter term junior year—2 hours.

Wood Structure (Forestry 12). A microscopic study of the commercial woods of the United States, which is used as a basis for identification and as a foundation for a fuller understanding of the principles of wood utilization. Winter term junior year—Lectures, 2 hours; laboratory work, 4 hours. Credit, 3 hours.

Forest Products and Utilization (Forestry 13). The physical and chemical properties of wood as related to its use for various purposes, as lumber, wood-pulp, wood distillation,

etc.; air-seasoning and kiln drying; wood preservation; naval stores and other important by-products of forests. Winter term junior year—3 hours.

Forest protection (Forestry 14). The protection of forests from injury by fire, insects, fungi, and other sorts of damage; injuries from climatic and seasonal influences; prevention of harmful results from grazing; economic aspects of forest protection. Winter term junior year—2 hours.

Physical Education 3a. A continuation of Course 2 along more advanced lines. Winter term junior year—2 hours. Credit, 1 hour.

Forestation (Forestry 23). The theory and practice of artificial propagation of forests by planting; studies of seeds and other modes of reproduction; nursery practice; planting plans. Spring term junior year—4 hours.

Dendrology (Forestry 24). The completion of Forestry 20 and 11. This is largely a field course with special emphasis upon the spring behaviour and development of the woody plants studied the first part of the year. Spring term junior year—2 hours.

Forest Entomology and Pathology (Forestry 25). A course to give the student a general working knowledge in the field of the more important species of insects, fungi, rusts, etc., which injure and destroy forests. The principles and practice of field methods of identification are given particular emphasis. Spring term junior year—2 hours.

Forest Working plans (Forestry 40). Various forms of working plans are studied with particular emphasis upon the applicability and adaptability of the different features to American forest conditions. The student does the field work to gather the necessary data for a working plan which he prepares for a portion of the Manitou Forest. Present conditions are determined with reference to the silvicultural state of the tract and their bearing on future growth and reproduction of the timber, and a plan is made for future operations to secure the most desirable results from all points of view. Fall term senior year—5 hours.

Forest Investigations (Forestry 41). The methods of investigating problems in technical forestry, illustrated by notable

examples of such work already carried out. The value of such studies in practical forestry is clearly brought out. Under careful supervision each student will make at least one field investigation of some technical problem of importance and will report upon it in detail, both as to methods employed and results secured. Fall term senior year—3 hours.

Forest Management (Forestry 30). The principles of economics underlying forest valuation, forest regulation, and forest finance; the methods of forest taxation and their effects on the practice of forestry. Winter term senior year—3 hours.

Logging and Lumbering (Forestry 31). A study of natural and economic factors which control woods and milling operations; methods and equipments used; cost-keeping and accounting; market requirements and conditions. Winter term senior year—5 hours.

Forest History and Policy (Forestry 32). The historical development of forest policies and administrative methods under the influences of economic and political conditions, both in the United States and in other countries, with a comprehensive review of existing organizations, conditions and policies. Winter term senior year—2 hours.

Mechanical Properties of Wood (Forestry 33). The relation of wood in use to stresses and strains; relation to strength of specific gravity, rate of growth, defects, etc. Laboratory tests are made of crushing, tensile, shearing and bending stresses of woods, their toughness, hardness, etc. Winter term senior year—2 hours.

Forest Construction Engineering (Forestry 34). The foundations of simple engineering as applied to the laying out and building of forest trails, logging roads and railroads, bridges, cabins, etc. Winter term senior year—2 hours.

Logging Plans (Forestry 42). A detailed study of some active logging operation is made, if possible under conditions distinctly different from those with which the student has been familiar. In connection with the logging plan for the tract which the student is required to prepare, a topographical map and timber estimate will be made, giving the opportunity for testing the costs and results of various methods of

mapping and cruising. The entire spring term is given to this trip and study. Spring term senior year—7 hours.

Fees and Expenses

Matriculation fee	\$ 5.00
Tuition by the year	120.00
Summer courses in Surveying, each of two years	15.00
Athletic and "Associated Students" fee	7.50
Rooms at Colorado College, warmed, lighted and furnished, for each occupant (who furnishes linen and bedding), by the year	50.00 to 90.00
Tents supplied at Manitou Forest without charge.	
Board in Cossitt Hall, by the week	7.00
Board at Manitou Forest, by the week	9.50
Laboratory fees for various courses are charged as follows:	
Biology 1	\$ 4.00
Biology 3	3.00
Biology 35	4.00
Chemistry 2	8.00
Civil 2	2.00
Physics 1 and 2	6.00

THE LIBRARY OF THE
APR 20 1901
UNIVERSITY OF ILLINOIS.

1c2 f
22/23

Colorado College Publication

BULLETIN SERIES 56

GENERAL SERIES 111

THE LIBRARY OF THE
UNIVERSITY OF ILLINOIS
APR 20 1931

Announcement

COLORADO SCHOOL OF FORESTRY

FEBRUARY, 1922

Published by authority of the
Board of Trustees of Colorado Col-
lege, every six weeks during the
academic year.

Entered as second-class matter
September 23, 1905, at the Post
Office at Colorado Springs, Colo-
rado, under Act of Congress of
July 16, 1894.

COLORADO COLLEGE PUBLICATION

BULLETIN SERIES 56

GENERAL SERIES 111

THE LIBRARY OF THE
APR 20 1931
UNIVERSITY OF ILLINOIS.

ANNOUNCEMENT

COLORADO SCHOOL OF FORESTRY

FEBRUARY, 1922

Calendar

1922

- Sept. 12. Registration. Residence halls open.
13. First half-year begins at 8 a. m.
For forestry freshmen and sophomores, at Colorado Springs.
For forestry juniors and seniors, at Manitou Forest.
- Nov. 29. Thanksgiving Recess begins at 5 p. m.
- Dec. 4. Thanksgiving Recess ends at 8 a. m.
Forestry juniors and seniors begin classes at Colorado Springs.
- Dec. 22. Christmas Recess begins at 5 p. m.

1923

- Jan. 3. Christmas Recess ends at 8 a. m.
20. Mid-year examinations begin.
29. Second half-year begins at 8 a. m.
- Feb. 22. Washington's Birthday, a holiday.
- Mar. 29. Spring Recess begins at 5 p. m.
- April 10. Spring Recess ends at 8 a. m.
Forestry juniors return to Manitou Forest.
Forestry seniors start on logging trip.
- May 30. Memorial Day, a holiday.
- June 2. Examinations begin.
4. Summer School of Surveying opens at Manitou Forest.
10. Baccalaureate Sermon.
11. Class Day.
13. Commencement.

Faculty

CLYDE AUGUSTUS DUNIWAY, PH. D., LL. D.

President

GUY HARRY ALBRIGHT, A. M.

Professor of Mathematics and Astronomy

FLORENCE MAY BRUMBACK, A. M.

Instructor in Biology

RALPH JOHN GILMORE, PH. D.

Professor of Biology

I. ALLEN KEYTE, B. S. in Ed.

Assistant Professor of Geology

WILLIAM V. LOVITT, PH. D.

Associate Professor of Mathematics

FRANK MORRIS OKEY, B. C. E.

Professor of Civil Engineering

GORDON PARKER, M. F.

Assistant Professor of Forestry

GEORGE KYNETT PATTEE, A. M.

Professor of English

CHARLES HERSCHEL SISAM, PH. D.

Professor of Mathematics

FRANK WILLIAM DOUGLAS, PH. D.

Associate Professor of Chemistry

ROLAND RAY TILESTON, A. M.

Professor of Physics

Opportunities for Foresters

Forestry, the art of raising and utilizing repeated crops of forest products—usually from lands unsuitable for agriculture,—is a comparatively new profession in the United States. The first professional teaching of the subject at a forestry school in this country was begun in 1898. At the present time there are some two thousand trained foresters in the United States, so that the profession of forestry can reasonably be said to have outgrown its infancy, although still, to be sure, in its early youth.

The openings for the forestry graduate are various. There is the great lumber business with its very steadily growing demand for competent, trained foresters; the large lumber associations; inspectors or timber experts or appraisers for owners of or dealers in large forest tracts, such as some of the pulp and paper companies or the railroads; private enterprise as consulting forester or in handling privately-owned forests or estates; teaching of forestry; State or City forestry work; or the National Forest Service. In the Forest Service of the United States the entrance salary for Forest Assistants—the usual initial appointment for the forestry graduate who is successful in passing the Civil Service examination—was raised in 1920 from \$1100 to \$1500 a year. This figure can be taken as a rough guide to the entrance salaries in other positions.

“Forestry Training in the Heart of the Rockies.”

The intimate personal familiarity which the successful forester must have with his forest in order to plan wisely for its handling and protection cannot be learned or acquired accurately anywhere else than in the forest itself. Teaching forestry by lectures and text-books alone is therefore unsatisfactory in method and results. The training for such work should be given largely in the woods where the student can come readily into direct contact with the conditions he is studying.

In this respect the Colorado School of Forestry is ideally situated and equipped. The School was established as a Depart-

ment of Colorado College in 1905 by General William J. Palmer and Dr. W. A. Bell through their presentation to the College of a tract of about 10,000 acres of timber and farming land. This tract, called Manitou Park, lies some 25 miles northwest of Colorado Springs, (7 miles north of Woodland Park on the Colorado Midland Railroad), up in the Rocky Mountains at an elevation of approximately 8,000 feet. Some 3,200 acres of the agricultural land have been sold and the proceeds applied toward an endowment for the School.

The remainder of the area, now known as the Manitou Forest, is well timbered with a relatively young stand of western yellow pine and Douglas fir. Excellent buildings and other camp facilities are provided so that the tract can be most advantageously used as a great field laboratory for forestry study, experiment and research. And such use is made of the area, much of the junior and senior years being spent at Camp Colorado, as the camp is called. The first cuttings in this timber were made some 40 years ago, and the results of this and subsequent operations, as they affect the remaining stand of timber, are studied on the ground. As opportunities offer from time to time the mature timber from the Forest will be sold and the logging and milling operations will be carefully studied as they progress. The adjoining Pike National Forest also offers similar possibilities when operations on the College timber are not in progress.

Course of Study

The aim of the Colorado School of Forestry is to give students who intend to adopt forestry as a profession a thorough technical training in the fundamentals of the art, and at the same time to develop as far as possible strong, mature men with broad outlook and individual self-reliance. The work of a forester covers many different lines and needs a knowledge of many other subjects besides the various divisions of forestry proper. He must know more than a smattering of chemistry, botany, mathematics and surveying, physics and geology. And in addition to his technical knowledge he must be a well-rounded man who can meet and do business with other men, who can take his place among the leaders of his community. It is with this end in view that the course of study at the Colorado School of Fores-

try has been developed,—to give as well-rounded an education as possible within the limits of a college course and at the same time cover the essential work which a forester must have. The course will prepare the student for positions in the Federal Forest Service or in other lines of forestry work, or for advanced study in forestry.

A four-year undergraduate course is offered. It is so designed that practically all of the technical study of forestry is concentrated in the junior and senior years. This is practically essential since so much of the forestry study is done in the field—at Manitou Forest or elsewhere—that it is impractical to keep up other college courses at the same time. The freshman and sophomore years are therefore given over to the necessary preliminary work in other Departments of Colorado College. In the junior year about two months each in fall and spring are spent at Manitou Forest, the intervening winter months being given to lectures and study at the College. The senior year is similarly divided except that it is planned that the spring term will be spent in practical work, usually on some relatively large lumbering operation. For the satisfactory completion of this course the College offers the degree of Bachelor of Science in Forestry.

The degree of Master of Forestry is offered to graduates of recognized colleges or universities for satisfactory completion of two years of graduate work in the Colorado School of Forestry. The ground to be covered is substantially the same as that which undergraduates must cover, it being presumed that the candidate will have completed the preliminary work in his undergraduate course so that the entire time can be devoted to the study of forestry alone. A thesis upon some approved technical problem in forestry will also be required. A higher grade of scholarship will naturally be demanded of candidates for the Master's degree than of undergraduates, since the higher degree is intended to represent something of real accomplishment rather than the perfunctory covering of certain prescribed ground.

An opportunity is offered to men spending five years in the study of forestry at Colorado College to secure both the degrees of Bachelor of Science and Master of Forestry within that time. Candidates intending to work for these degrees should consult

with the Department of Forestry immediately on entering the College so that their courses can be properly selected from the very start. The Bachelor's degree will be given on successful completion of the fourth year and the Master's degree at the end of the fifth. The thesis and the higher grade of scholarship will be required during the fifth year, as discussed in the preceding paragraph.

To be accredited as passing work, a course must be graded not lower than 60%.

Terms of Admission

Before registering each candidate must present to the Dean a certificate of moral character, signed by some responsible person in the community in which he has made his home. Students must register promptly and attend the first exercise in their courses.

THE ENTRANCE REQUIREMENTS FOR THE COLORADO SCHOOL OF FORESTRY ARE AS FOLLOWS:

1. MATHEMATICS 3 units.* Algebra (including Binomial Theorem, Progressions, Permutations and Combinations), Plane, Solid and Spherical Geometry.
2. PHYSICS 1 unit.
3. CHEMISTRY 1 unit.
4. ENGLISH 3 units. This includes a practical knowledge of grammar and the elements of rhetoric and a study of certain selected works.
5. FOREIGN LANGUAGES 2 units. French, Spanish, German, Latin, or Greek.
6. HISTORY 1 unit. American, English, or Ancient History.
7. ELECTIVES 4 units. Preferably in Mathematics, Modern Languages and History. It is extremely desirable that plane trigonometry be offered for entrance, in order to lighten up the otherwise heavily-loaded second half of the freshman year.

* A unit is a course covering a school year of not less than 35 weeks, with 4 or 5 periods of at least 40 minutes each a week. Only one unit of deficiency is allowed for entrance.

Candidates who offer satisfactory evidence of having completed a preparatory course equivalent to the above requirements will be admitted without condition into the freshman class. Each candidate must bring from the principal of the school last attended a personal statement as to his grade of scholarship.

Curriculum

The program of study for the four-year course as it is outlined below covers the essentials of the work which it is felt that a forester must have. Because of the wide field to be covered and the comparatively short time available for it in the four years, very little flexibility or choice remains for the student, to meet individual desires. For this reason particularly, as well as because of the fuller, broader training which it provides, the five-year course previously described is urgently recommended. The additional courses to be taken are arranged to suit individual cases after consultation with the head of the Department of Forestry. A few of the very desirable courses suggested are in Economics, Accounting, Cost Keeping, Mineralogy, Meteorology, Advanced English, stronger courses in Mathematics and Physics than those prescribed, etc.

THE SCHEDULE FOR THE FOUR-YEAR COURSE IS AS FOLLOWS:

FRESHMAN YEAR

	First Half	Second Half
Elements of Biology (Biology 1) (Including both Botany and Zoology).....	3 hours	3 hours
Advanced Chemistry (Chemistry 2).....	3	3
Algebra (Mathematics 1)	3	..
Plane Trigonometry (Mathematics 3).....	..	2
Rhetoric and Composition (English 1).....	3	3
Mapping (Graphics 6)	1	..
Surveying Theory (Civil 1).....	..	2
Elementary Forestry (Forestry 1).....	1	..
Modern Language	3	3
Physical Education ..1.....	1	1
Credit Hours	18	17

Immediately at the close of the freshman year a four weeks' field course in Surveying Practice (Civil 201) is given at Manitou Park. Credit, 4 hours.

SOPHOMORE YEAR

	First Half	Second Half
General Geology (Geology 1).....	3 hours	3 hours
Botany of Seed Plants (Biology 3).....	3	..
Plant Physiology and Ecology (Biology 35) ..	..	3
General Physics (Physics 1 and 2).....	3	3
Advanced Surveying Theory (Civil 5).....	2	..
Field Astronomy (Civil 2).....	..	3
Elementary Local Dendrology (Forestry 2) ..	1	..
Modern Language	3	3
Physical Education	1	1
Credit hours.....	16	16

Immediately at the close of the sophomore year a four weeks' field course in Advanced Surveying Practice (Civil 211) is given at Manitou Forest. Credit, 4 hours.

JUNIOR YEAR

	Credit Hours
Fall term (9 weeks at Manitou Forest)	
Dendrology (Forestry 20).....	2
Fundamentals of Silviculture (Forestry 21).....	3
Forest Measurements (Forestry 22).....	3
Winter Term (13 weeks at Colorado Springs)	
Advanced Silviculture (Forestry 10).....	3
Dendrology (Forestry 11).....	2
Wood Structure (Forestry 12).....	3
Forest Products and Utilization (Forestry 13).....	3
Forest Protection (Forestry 14).....	2
Physical Education 3a.....	1
Spring Term (8 weeks at Manitou Forest)	
Forestation (Forestry 23).....	3
Dendrology (Forestry 24).....	2
Forest Entomology and Pathology (Forestry 25)	2
Credit hours.....	29

SENIOR YEAR

	Credit Hours
Fall Term (9 weeks at Manitou Forest)	
Forest Working Plans (Forestry 40).....	5
Forest Investigations (Forestry 41).....	3
Winter Term (13 weeks at Colorado Springs)	
Forest Management (Forestry 30).....	3
Logging and Lumbering (Forestry 31).....	5
Forest History and Policy (Forestry 32).....	2
Mechanical Properties of Wood (Forestry 33).....	2
Forest Construction Engineering (Forestry 34)....	2
Spring Term (7 weeks on Logging Field Trip)	
Logging Plans (Forestry 42).....	7
Credit hours.....	29

Description of Courses

Elements of Biology (Biology 1). A broad general view of the fundamental facts and principles of plant and animal life. The forms, life histories, structures, activities and adaptations of representative forms are carefully studied, with the most important evolutionary tendencies which they exhibit. Each half freshman year—Lectures and recitations, 3 hours; laboratory work, 4 hours. Credit, 3 hours.

Advanced Chemistry (Chemistry 2). The lectures treat chiefly of inorganic chemistry, but half of the second semester is given to organic chemistry. The principles of chemical science are studied, the chemical laws and their methods of deduction, and chemical reactions. The applications of chemistry to the arts, to sanitary science, and to common uses are made prominent. Each half freshman year—Lectures, 3 hours; quiz, 1 hour; laboratory work, 4 hours. Credit, 3 hours.

Algebra (Mathematics 1). Graphs, variation, linear equations, theory of exponents, quadratic equations, progressions, permutations and combinations, theory of equations. First half freshman year—3 hours.

Plane Trigonometry (Mathematics 3). Logarithms, the func-

tions of one and two angles, inverse functions, the solution of triangles. This course is required of freshmen in forestry who do not present entrance credit for it. Second half freshman year—2 hours.

Rhetoric and Composition (English 1). Exercises in composition and readings chosen to represent the principal literary types to make clear in theory and practice the general rhetorical principles and rules applicable to all kinds of prose composition. Each half freshman year—3 hours.

Mapping (Graphics 6). A special course for forestry students in the practical work of making and lettering maps. First half freshman year—3 hours. Credit, 1 hour.

Surveying Theory (Civil 1). Theory of plane surveying, construction, use, care and adjustment of instruments, computation of areas and volumes, map specifications. Second half freshman year—Recitations and problems, 2 hours.

Elementary Forestry (Forestry 1). This is planned to give the forestry student at the beginning of his course a general introduction to the subject. It takes up the economic importance of forestry in the National life, the general objects whose attainment is sought by the forester, a broad view of the profession as a whole, and a brief outline of the work to be covered in the entire course, showing the correlation of the subjects to be studied. First half freshman year—Lectures and discussions, 1 hour.

Modern Language. Students who enter College with some knowledge of a modern language will probably do well to continue the study of that same language. Courses are offered in French, German, Italian, and Spanish.

A reading knowledge of German is very useful to the forestry student because much technical writing of value upon that subject has been done in German. To a forester who has any thought of practicing his profession in the Southwest of the United States a knowledge of Spanish might be valuable in dealing with the Mexicans found in that part of our Country.

A few of the courses offered are described below:—

Elementary French (French 1). Reading, grammar, composition, writing from dictation, and practice in speaking. Each half year—3 hours.

Intermediate French (French 2). Syntax and prose composition, readings from selected authors, and oral work based on texts read. Each half-year—3 hours,

Elementary German (German 1). Reading, grammar, composition, conversation. The "direct method" of instruction is used. Each half-year—3 hours.

Scientific German (German 3). Designed to give the student a reasonable degree of facility in reading technical German such as is usually found in forestry or other scientific articles. Each half-year—2 hours.

Elementary Italian (Italian 1). Reading, grammar, composition, dictation. Each half-year—3 hours.

Italian Literature (Italian 2). Modern prose, lectures and reading. Each half-year—3 hours.

Elementary Spanish (Spanish 1). Reading, grammar, composition, writing from dictation, and practice in speaking. Each half-year—3 hours.

Intermediate Spanish (Spanish 2). Lectures, readings from selected authors, oral work based on texts read, syntax and prose composition. Each half-year—3 hours.

Physical Education. Elementary work in marching, calisthenics, gymnastic dancing, heavy apparatus, and games of the competitive type. Each half freshman year—3 hours. Credit, 1 hour.

Surveying Practice (Civil 201). Field practice in plane surveying. Four weeks at Manitou Forest during June, freshman year. Credit, 4 hours.

General Geology (Geology 1). Dynamical, structural and historical geology. Each half sophomore year—Lectures and discussions, 3 hours; laboratory and field work, 2 hours. Credit, 3 hours.

Botany of Seed Plants (Biology 3). The structures and functions of seed plants, including the influence of environment, distribution, variation, heredity and classification. First half sophomore year—Lectures and recitations, 2 hours; laboratory and field work, 4 hours. Credit, 3 hours.

Plant Physiology and Ecology (Biology 35). A study of the processes involved in the material income and outgo of plants, their nutrition, metabolism and growth as individuals. Plants *en masse* are studied later with relation to their physiographic environment, showing the tendency of vegetation to work toward a climax forest condition. Second half sophomore year—Lectures and recitations, 2 hours; laboratory and field work, 4 hours. Credit, 3 hours.

General Physics (Physics 1 and 2). A course offered especially for students (like those in forestry) who have only a limited time they can give to this subject and wish to secure the fundamentals of it in a single year. The lectures are illustrated by lantern slides and by experiments of historical interest. Each half sophomore year—Lectures and recitations, 3 hours; laboratory work, 4 hours. Credit, 3 hours.

Advanced Surveying Theory (Civil 5). Theory of topographic, hydrographic, geodetic, city, and mine surveying, stadia measurements and plane table. First half sophomore year—Recitations, lectures and problems, 2 hours.

Field Astronomy (Civil 2). The determination of latitude, longitude, azimuth and time by means of sextant, engineer's transit and chronometer. The application of astronomy to surveying problems. Second half sophomore year—Recitations, 2 hours; field work, 3 hours. Credit, 3 hours.

Elementary Local Dendrology (Forestry 2). A brief study of the trees and shrubs found in Colorado Springs and the nearby mountains, particularly in their autumn and winter aspects. Some brief field trips will be arranged. First half sophomore year—1 hour.

Physical Education 2. A continuation of Course 1 with wider scope, more varied methods, and greater emphasis on correctness and readiness of response. Each half sophomore year—2 hours. Credit, 1 hour.

Advanced Surveying Practice (Civil 211). Field practice in advanced surveying. Four weeks at Manitou Forest during June, sophomore year. Credit, 4 hours.

Dendrology (Forestry 20). A study of the trees and shrubs found in the vicinity of Manitou Forest, in order to begin the student's acquaintance with the forest flora of the

vicinity and the relations of the different species and their environment. A general introduction to the subject, to be followed up more fully in the continuation of the course in the succeeding term. Fall term junior year—2 hours.

Fundamentals of Silviculture (Forestry 21). The foundations of silviculture as applied to the study, description and treatment of local forest crops, taking up the factors governing the distribution, life history, growth and natural reproduction of forests; the silvics of local species; the principles of forest cuttings for improvement and reproduction, and practical work in marking for such cuttings; practice in the accurate analysis of forest conditions in the field; forest description. Fall term junior year—3 hours.

Forest Measurements (Forestry 22). The determination of the volume and growth in commercial units, of trees and stands of trees; measurement of logs and cordwood; construction and use of log scales, volume tables and yield tables. Practical work in the field is an important part of this course. Fall term junior year—3 hours.

Advanced Silviculture (Forestry 10). The forest regions of the United States with reference to physiography and climate; distribution, composition and life history of the forests; the various silvicultural systems, their objects and results. Winter term junior year—3 hours.

Dendrology (Forestry 11). A continuation of Forestry 20, taking up the forest trees of North America, particularly those of economic importance. Special attention will be given to identification of the various species in different stages of growth and in summer and winter aspects. Winter term junior year—2 hours.

Wood Structure (Forestry 12). A microscopic study of the commercial woods of the United States, which is used as a basis for identification and as a foundation for a fuller understanding of the principles of wood utilization. Winter term junior year—Lectures, 2 hours; laboratory work, 4 hours. Credit, 3 hours.

Forest Products and Utilization (Forestry 13). The physical and chemical properties of wood as related to its use for various purposes, as lumber, wood-pulp, wood distillation,

etc.; air-seasoning and kiln drying; wood preservation; naval stores and other important by-products of forests. Winter term junior year—3 hours.

Forest protection (Forestry 14). The protection of forests from injury by fire, insects, fungi, and other sorts of damage; injuries from climatic and seasonal influences; prevention of harmful results from grazing; economic aspects of forest protection. Winter term junior year—2 hours.

Physical Education 3a. A continuation of Course 2 along more advanced lines. Winter term junior year—2 hours. Credit, 1 hour.

Forestation (Forestry 23). The theory and practice of artificial propagation of forests by planting; studies of seeds and other modes of reproduction; nursery practice; planting plans. Spring term junior year—4 hours.

Dendrology (Forestry 24). The completion of Forestry 20 and 11. This is largely a field course with special emphasis upon the spring behaviour and development of the woody plants studied the first part of the year. Spring term junior year—2 hours.

Forest Entomology and Pathology (Forestry 25). A course to give the student a general working knowledge in the field of the more important species of insects, fungi, rusts, etc., which injure and destroy forests. The principles and practice of field methods of identification are given particular emphasis. Spring term junior year—2 hours.

Forest Working plans (Forestry 40). Various forms of working plans are studied with particular emphasis upon the applicability and adaptability of the different features to American forest conditions. The student does the field work to gather the necessary data for a working plan which he prepares for a portion of the Manitou Forest. Present conditions are determined with reference to the silvicultural state of the tract and their bearing on future growth and reproduction of the timber, and a plan is made for future operations to secure the most desirable results from all points of view. Fall term senior year—5 hours.

Forest Investigations (Forestry 41). The methods of investigating problems in technical forestry, illustrated by notable

examples of such work already carried out. The value of such studies in practical forestry is clearly brought out. Under careful supervision each student will make at least one field investigation of some technical problem of importance and will report upon it in detail, both as to methods employed and results secured. Fall term senior year—3 hours.

Forest Management (Forestry 30). The principles of economics underlying forest valuation, forest regulation, and forest finance; the methods of forest taxation and their effects on the practice of forestry. Winter term senior year—3 hours.

Logging and Lumbering (Forestry 31). A study of natural and economic factors which control woods and milling operations; methods and equipments used; cost-keeping and accounting; market requirements and conditions. Winter term senior year—5 hours.

Forest History and Policy (Forestry 32). The historical development of forest policies and administrative methods under the influences of economic and political conditions, both in the United States and in other countries, with a comprehensive review of existing organizations, conditions and policies. Winter term senior year—2 hours.

Mechanical Properties of Wood (Forestry 33). The relation of wood in use to stresses and strains; relation to strength of specific gravity, rate of growth, defects, etc. Laboratory tests are made of crushing, tensile, shearing and bending stresses of woods, their toughness, hardness, etc. Winter term senior year—2 hours.

Forest Construction Engineering (Forestry 34). The foundations of simple engineering as applied to the laying out and building of forest trails, logging roads and railroads, bridges, cabins, etc. Winter term senior year—2 hours.

Logging Plans (Forestry 42). A detailed study of some active logging operation is made, if possible under conditions distinctly different from those with which the student has been familiar. In connection with the logging plan for the tract which the student is required to prepare, a topographical map and timber estimate will be made, giving the opportunity for testing the costs and results of various methods of

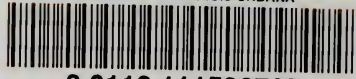
mapping and cruising. The entire spring term is given to this trip and study. Spring term senior year—7 hours.

Fees and Expenses

Matriculation fee	\$ 5.00
Tuition by the year	150.00
Summer courses in Surveying, each of two years	15.00
Athletic and "Associated Students" fee	7.50
Rooms at Colorado College, warmed, lighted and furnished, for each occupant (who furnishes linen and bedding), by the year	50.00 to 90.00
Tents supplied at Manitou Forest without charge.	
Board in Cossitt Hall, by the week	7.25
Board at Manitou Forest, by the week	9.50
Laboratory fees for various courses are charged as follows:	
Biology 1	\$ 4.00
Biology 3	3.00
Biology 35	4.00
Chemistry 2	8.00
Civil 2	2.00
Physics 1 and 2	6.00

THE LIBRARY OF THE
APR 40 1931
UNIVERSITY OF ILLINOIS.

UNIVERSITY OF ILLINOIS-URBANA



3 0112 111536725